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First Report of the Toxic Substances Committee. Report to the Great Lakes Water Quality Board

Toxic Substances Committee

GREAT LAKES WATER QUALITY BOARD

INTERNATIONAL JOINT COMMISSION

FIRST REPORT OF THE TOXIC SUBSTANCES COMMITTEE

REPORT TO THE

GREAT LAKES WATER QUALITY BOARD

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PREFACE

This is the first report of the Toxic Substances Committee to the Great Lakes Water Quality Board. The report summarizes the activities of the Committee to date in its planned evaluation of programs, projects, activities, and other measures related to the control of toxic substances. A toxic substances management framework has been developed, and basic information on toxic substances legislation of the Great Lakes jurisdictions compiled. An initial inventory of data bases and information systems has been prepared.

The Toxic Substances Committee gratefully acknowledges the contributions of Mrs. Mary Ann Benoit and Mrs. Terry Verzosa who typed the text, and Mr. Yvan Gagne, who prepared the figures and the headings.

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1 INTRODUCTION AND SUMMARY

BACKGROUND

More than 30,000 compounds of commercial and industrial significance are now being produced in the Great Lakes Basin, and 2,000 - 3,000 new compounds are being added each year. The Water Quality Board's Appendix E report, dated July 1978, lists 381 organic and heavy metal contaminants which have been identified as present in the Great Lakes Ecosystem; 38 additional contaminants were identified in 1979.

The Health Effects Committee, established jointly by the Water Quality Board and the Science Advisory Board, has conducted a preliminary evaluation of the human health hazard associated with the 381 identified substances. They considered acute toxicity or chronic adverse effects to humans, or chronic adverse effects to animals, and concluded that 89 of these substances should be investigated further to establish both effects and the potential for human exposure.

The Water Quality Board, in recognition of both the jurisdictional initiatives and the public concerns about toxic substances, established early in 1980 a Toxic Substances Committee. The Committee's terms of reference are given on page 97.

The Toxic Substances Committee established as its primary objective to:

> Provide a detailed evaluation of the effectiveness of programs, projects, activities, and other measures which are being conducted under the auspices of federal, state, and provincial legislation, to protect human health and the environment from the effects of toxic and hazardous substances.

Each of the Great Lakes jurisdictions has passed specific legislation and initiated programs and measures, the goals of which are to minimize the effects of toxic substances on human health and the environment. In addition, several pieces of existing legislation have been refocussed onto the toxic substances issue. Further, through the 1978 Great Lakes Water Quality Agreement, both the United States and Canada have obligated themselves to a number of cooperative and complementary measures specific for the Great Lakes Ecosystem.

Nonetheless, the identification of toxic substances in the ecosystem, the growing number of chemicals, and the lack of complete understanding about their effects has generated public concern about the ability of chemical producers, users, and governments to ensure the safety and well being of the Great Lakes Ecosystem and the human beings living within the basin area.

EVALUATION OF TOXIC SUBSTANCES PROGRAMS

The toxic substances issue is complex. Therefore, in order to provide a basis for a meaningful evaluation, the Toxic Substances Committee developed a

program management framework (Figure 1 on page 6), based upon the outline presented by the Water Quality Board to the International Joint Commission in July 1979. The framework can be used to describe the component parts of the issue, and to provide a consistent standard against which to assess jurisdictional capabilities and activities. Jurisdictional activities can be related to, and compared within the context of the framework. The framework can also be used to develop criteria to evaluate toxic substances control programs, identify strengths and weaknesses, and develop recommendations for additional programs.

The framework is described in Chapter 2.

Annex 12 of the 1978 Agreement identifies several programs and measures which must be effected in order to provide the desired protection from toxic and hazardous substances. The Toxic Substances Committee has related these to the elements of the framework (Table 1), which was developed as a more comprehensive approach to the toxics issue and which provides for interaction of the various components of programs so that a working evaluation could proceed. The Committee's assessment of jurisdictional activities in support of these programs and measures will summarize progress of the Parties in meeting these obligations in the 1978 Agreement.

Using the framework as its basis, the Toxic Substances Committee has developed a work plan to evaluate toxic substances programs in detail. The Committee is outlining a necessary and sufficient program to meet the requirements of each element of the framework (Figure 1 and Table 2). Jurisdictional activities, accomplishments, and resources will be compared to this ideal program, and strengths and weaknesses will be assessed. An evaluation for each framework element will be developed, as will an overall evaluation of jurisdictional success in addressing the toxic substances issue.

As the first step in its evaluation, the Toxic Substances Committee has compiled information on that legislation which effects a measure of control over toxic substances in the Great Lakes Basin. The organization and the content of the compilation is summarized in Chapter 3. The details are presented in Chapters 4, 5, and 6 for U. S. federal-state, Canada, and Ontario, respectively.

The Toxic Substances Committee has examined these major pieces of legislation in relation to the specific elements of the framework, and concludes that, collectively, these statutes provide an adequate legislative basis with which to protect human health and the environment from the effects of toxic substances. However, a pragmatic evaluation will require a detailed investigation of programs, projects, activities, and other measures which have been developed in response to perceived needs. The Toxic Substances Committee is presently compiling this information.

As a supporting activity to its evaluation, the Toxic Substances Committee has compiled an initial inventory of data bases and information systems (Chapter 7). The Committee will evaluate and assess these systems and identify those which it considers to be the most useful to those involved in toxic substances control programs.

TABLE 1

RELATIONSHIP OF FRAMEWORK ELEMENTS AND TASKS

TO ANNEX 12

TASK	METHOD(S)	APPROPRIATE ANNEX 12 SECTION
1. INFORMATION BASE		
I. Establish universe of chemicals for consideration.	1. Conduct an inventory.	3(a), 5(b), 5(h)
II. Preliminary selection of candidate substances	1. Preliminary manufacture and use surveys.	3(a), 4(c), 5(b)
	2. Environmental measurements.	3(b), 4(d), 5(e)
	3. Physical, chemical, and toxicological characteristics.	5(c), 5(h)
2. ASSESSMENT		
III. Determine effects.	1. Identify potential environmental effects.	4(b), 5(c), 5(d), 5(h)
	2. Identify potential health effects.	4(b), 5(c), 5(d), 5(h)
	3. Develop and use structure-activity correlations.	5(a), 5(c)
IV. Determine exposure.	1. Environmental measurements.	4(a), 5(c), 5(f)
	2. Detailed manufacture and use surveys to identify entry to the environment.	3(a), 4(c), 5(b), 5(h)
	3. Environmental fate studies.	5(c), 5(f), 5(h), 7(a)
	4. Identify exposed organisms.	
	5. Identify routes of exposure.	
	6. Environmental and health effects monitoring.	4(b), 5(f), 7(a)
V. Determine hazard.		
VI. Assess risk and determine acceptable level of risk.	1. Risk analysis.	7(b), 7(c)
	2. Cost-benefit analysis.	
3. ACTION		
VII. Develop plans of action.	1. Identify and define alternative control strategies.	3(b), 7(c), 3(c)
	2. Identify need for new technology.	
VIII. Decision on a control program.	1. Analysis of alternatives.	3(b), 5(g), 6
	2. Cost-benefit analysis.	
	3. Agency resource availability analysis.	
	4. Social-political considerations.	
	5. Technology development.	
IX. Implementation of control programs.		6
4. EVALUATION		
X. Evaluation of effectiveness.		
XI. Modification of programs as required.		

2 FRAMEWORK FOR TOXIC SUBSTANCES

THE ISSUE

Some 30,000 compounds of commercial and industrial significance are now on the market and being used in the Great Lakes Basin, and some 2,000-3,000 new compounds are being added each year. Approximately 400 toxic substances have already been identified in the Great Lakes ecosystem with an additional 38 new contaminants identified in 1979. The identification of existing toxic substances, the growing number of chemicals, and the lack of complete understanding of their effects, singly or in combination, has generated public concern regarding the ability of chemical producers, users, and governments to ensure the safety and well being of the Great Lakes ecosystem and humans living within the basin area.

DEFINITION

The effects of any chemical or mixture depends not only on the physical-chemical characteristics and ecological characteristics, but also on other factors such as the dosage, route, the duration of exposure, and the susceptibility of the organism exposed. Some chemicals may also become more toxic when degraded, or when they are combined in the environment with other substances. Toxic substances have been defined as those chemical substances which, when released into the environment, or if transformed by chemical, physical, and biochemical processes after release, could be detrimental to natural ecosystems or to human health. They are often highly resistant to degradation and persist; are frequently capable of causing biological changes at trace concentrations; and/or bioconcentrate into aquatic organisms and bioaccumulate up food chains. Persistent toxic substances are generally irretrievable once released into the environment and their effects can, within a time frame meaningful for human society, be effectively irreversible.

THE PURPOSE

In order to simplify the complex toxic substances issue into manageable components, a general framework of an international program to control toxic substances in the Great Lakes Basin has been developed (Figure 1).

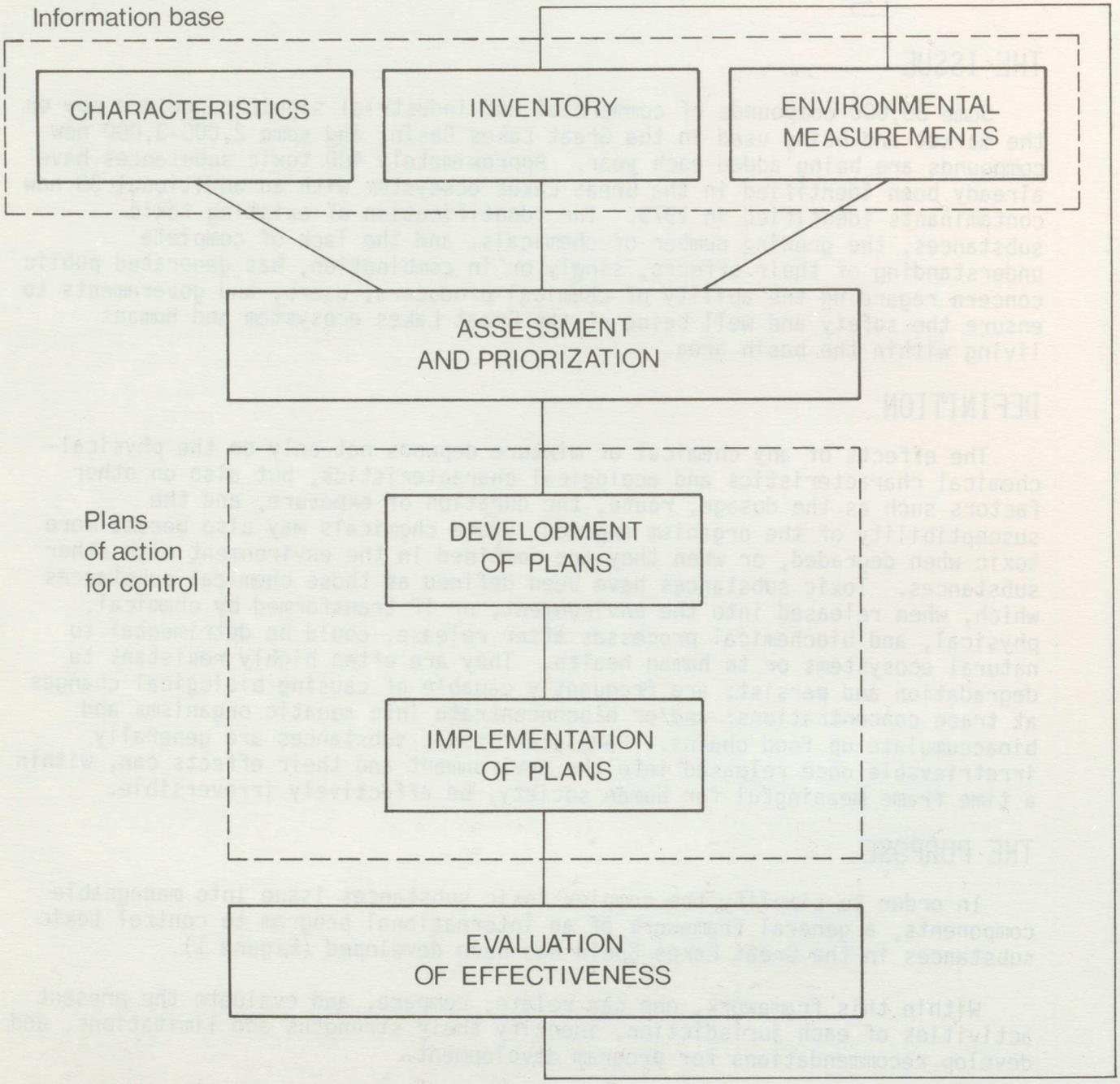
Within this framework, one can relate, compare, and evaluate the present activities of each jurisdiction, identify their strengths and limitations, and develop recommendations for program development.

Management of toxic substances faces a three-fold problem: to effectively control the toxic substances presently being emitted into the Great Lakes Basin, to manage areas already seriously contaminated, and to control the future release of newly developed toxic substances into the Great Lakes Basin.

COMPONENTS OF THE FRAMEWORK

Management of toxic substances can be subdivided into four basic components: an information base, an assessment, action being taken regarding

Figure 1 Toxic Substances Framework



Lines are drawn without arrows to indicate feedback or interaction in both directions between various components.

that toxic substance and, finally, an evaluation of the effectiveness of that action. Each of these four components comprise distinct tasks as shown in Table 2.

INFORMATION BASE

The information base provides the groundwork for any assessment. The hazard associated with a particular substance is established by considering both the effects of the substance and the exposure to it, either potential or actual. The determination of exposure and effects is based solely on scientific, technical, and inventory data. These information requirements can be subdivided into three broad categories: environmental measurements, inventory, and characteristics. For the purpose of this framework, the transport of hazardous toxic materials and disposal of hazardous toxic waste is also considered.

ENVIRONMENTAL MEASUREMENTS

This category includes the data generated on the actual incidence and accumulation of specific chemical substances during monitoring and surveillance activities.

These activities include:

1. The identification and quantification of known and "new" (previously undetected) potentially toxic, chemicals in the environment

2. The identification of instances where environmental objectives designed to protect health, to prevent transboundary damages or damages to resources have been violated

3. The determination of trends in environmental concentrations of identified toxic chemicals in the Great Lakes ecosystem as a measure of program effectiveness.

The program must be conceived so that:

1. Concentrations in water, air, soil, and sediment can be related to those in biota, including man, and to sources and sinks of the chemicals

2. It is selective to ensure the effective use of resources

3. It is well integrated with state and provincial programs, likely best achieved through formal agreements, as already requested by some political subdivisions

4. Results are interpreted and reported for assessment for the development of Plans of Action, and for the evaluation of the effectiveness of control measures.

TABLE 2

PROPOSED FRAMEWORK FOR TOXIC SUBSTANCES

COMPONENT	TASKS
A. INFORMATION BASE	1. Environmental Measurements 2. Inventory Compilation 3. Characteristics
B. ASSESSMENT	1. Determine exposure and effects 2. Establish hazard 3. Determine acceptable level of risk
C. ACTION FOR CONTROL	1. Planning 2. Decisions 3. Implementation
D. EVALUATION OF EFFECTIVENESS	1. Evaluation of effectiveness of strategy 2. Modifications

INVENTORY

Four types of inventories determine which substances should be considered for an assessment because of their actual or potential for deleterious environmental consequences as a result of their release into the environment:

1. Qualitative and quantitative information about what chemicals are produced, imported, transported, or used at specific locations in the Great Lakes Basin.

2. Information about types of industries, raw materials used, production processes, products and byproducts produced.

3. Point source discharge and emission information establishes which substances are being released in the ecosystem.

4. Information on the location and the number of disposal sites and substances disposed therein.

CHARACTERISTICS

Physical, chemical, toxicological, and other scientific information is required in order to establish potential environmental and health effects of a chemical substance. Interpretation of these data indicates the movement, fate, and effects of substances within the ecosystem and therefore the potential for exposure to that substance.

Characteristics can be subdivided into properties such as:

1. Physical and Chemical Properties

   i) Structure
   ii) Solubility in water and organic solvents, partition coefficient
   iii) Volatility

2. Ecological Properties

   i) Sorption
   ii) Bioaccumulation and bioconcentration
   iii) Persistence
   iv) Degradation: chemical, physical

3. Toxicological Properties

   i) Carcinogenicity
   ii) Teratogenicity
   iii) Mutagenicity
   iv) Neurotoxicity
   v) Acute and chronic toxicity

4. Other Properties

   i) Aesthetics
   ii) Structure-activity correlation

ASSESSMENT AND PRIORITIZATION

The objective of conducting an assessment is to determine with a reasonable degree of confidence whether or not a substance should be subject to regulation or control and what form this regulation or control should take. Hazard assessment involves a series of steps including, most often, a preliminary assessment based on initially available data which are used to prioritize the toxic substances for further measurement, testing, surveillance or research required for a final assessment. Estimation of an acceptable level of risk considers the hazard assessment and the social, political, and economic factors involved.

The input to assessment comes from a combination of information obtained in Measurement, Inventory, and Characteristics. Its output is an assessment of existing or potential effects or a statement of priorities leading to the development of Plans of Action.

HAZARD ASSESSMENT

The procedure followed to utilize available scientific, technical, and inventory information is achieved by means of formal process, using specific criteria and rationale within a program framework and with definite goals. One first decides what decisions must be made, develops the procedure for evaluating the information necessary to make the decisions and, finally, assembles that information.

To determine effects, one first obtains a rough idea of the characteristics of a particular substance and then refines this estimate. Simple, inexpensive tests and criteria (e.g. structure-activity correlations, partition coefficients, Ames test) are considered first. The interpretation of data from these tests has a high degree of uncertainty for evaluating potential effects but does provide direction to the additional testing and information which will be required. One proceeds to more sophisticated and expensive tests and criteria (e.g. full life-cycle testing on a species at risk). The interpretation of these data has a higher degree of certainty for evaluating potential or real effects.

The determination of effects and of exposure follows a sequential procedure through a series of screens. The criteria, the order in which they are used, and the information obtained for each are weighed in accordance with their perceived importance. The sequential procedure contains decision points, at which the information available is reviewed and a decision made whether or not higher level testing is required. Ecosystem testing and environmental measurement is the ultimate evaluation of a specific pollutant or suite of pollutants. If it is deemed that the effects and the exposure have been adequately determined, the hazard assessment is complete and a decision can be made whether a substance does or does not pose a clearly defined hazard. If a clear-cut decision cannot be made, the additional information required to reach a decision is again decided upon, and further testing carried out. This iterative procedure is followed until the required decisions assessing the hazard can be reached.

RISK ASSESSMENT

Risk assessment is an estimate of the probability that a chemical will cause an adverse effect in humans, other living organisms, or important non-living environmental components. Potential effects may be manifested in the short or the long term when an environmental release or an exposure to humans or other living organisms occurs. Risk assessment is an analytical process for determining levels of risk associated with the effects of exposure to given levels of a toxic substance.

An acceptable level of risk is established by weighing the cost to society, represented by the risk assessment, against the benefits perceived by a social, economic, and political analysis. The decisions reached determine the type and the urgency of the action to be taken. Since risk assessment is a best estimate, the acceptable level of risk may change, if significantly different hazards become evident upon interpretation of new information.

PLANS OF ACTION

Action in response to a perceived or proven risk is in the form of legislation, regulations, and programs. These are developed within the institutional framework of the jurisdiction. The action consists of:

1. Planning: What type of control is required and where within the handling of toxic substances should it be applied? The adequacy of present authorities is reviewed. Alternative strategies, including the need for new legislation, regulations, and programs, and the need for new technology are identified and developed.

2. Decisions: Alternatives are analyzed, including costs versus benefits, social and political considerations, and resources available for implementation or for required technological development. Decisions are then reached on a course of action.

3. Implementation of Control Strategies: Implementation can include such diverse activities as development of regulations, water and air quality standards, procedures, and permits; commitment of resources (e.g. capital development programs, assignment of manpower); and collection of data (e.g. through expanded surveillance and monitoring).

EVALUATION OF EFFECTIVENESS

The strategy to control a substance, and the evaluation of the effectiveness of that strategy, is reflected in the circular nature of the toxic substances framework (Figure 1).

Trend analysis of surveillance and monitoring data, tracking the movement of substances among compartments of the ecosystem, and determining the fate of these substances all measure the response of the ecosystem. Therefore, surveillance, monitoring, and research not only provide part of the basis for assessment, but also constitute part of the evaluation of effectiveness of

control strategies. The adequacy of programs such as data gathering, surveillance, and monitoring can be determined, and modifications to both the programs and the overall strategy can be developed and implemented as required.

3 TOXIC SUBSTANCES LEGISLATION

The compilations given in Chapters 4, 5, and 6 for U.S. federal-state, Canada federal, and Ontario, respectively, deal with legislation and programs in the various Great Lakes jurisdictions, but without evaluating their effectiveness. Each major statute is reviewed in relation to the major elements of the framework: Information, Assessment, and Control. Each discussion includes a brief description of the law, its regulations, and the programs developed under its legislative mandate.

The introduction for each discussion explains how the law effects toxics control, including its scope or limitations. The agency or department with primary responsibility for implementing the law is identified, as well as other agencies routinely involved with some aspect of its implementation. The laws are also classified as to how they affect the Great Lakes, whether by preventing entry of toxics into the lakes, by measuring the quality of the lakes, or by affecting the use of the lakes due to toxic contamination.

UNITED STATES FEDERAL AND STATE LEGISLATION

A variety of laws exist in the United States which effect some control over toxic substances. These laws have been placed into two categories for purposes of this discussion. The first category presents environmental laws which have significant impact on toxic substances control, or monitoring in the Great Lakes; the major program activities authorized by these laws are discussed at the federal and state levels, using the program framework presented in Chapter 2. The laws discussed in Chapter 4 include:

1. Clean Water Act
2. Clean Air Act
3. Resource Conservation and Recovery Act
4. Safe Drinking Water Act
5. Federal Insecticide, Fungicide, and Rodenticide Act
6. Toxic Substances Control Act.

The second category includes laws whose main influence is with public health and safety and, therefore, exert a less direct effect on control of toxic substances. These are also summarized in Chapter 4.

In order to simplify the presentation, the U.S. portion of the report describes the federal laws according to the framework. State laws and programs are discussed against this federal backdrop to show key implementation roles or additional authorities where they exist.

SIGNIFICANT STATUTES

The most significant U.S. environmental laws are those which control waste disposal (into air, water, land) and those which control products (pesticides, other chemicals). Waste disposal laws are generally oriented to the media receiving the wastes, such as the Clean Air Act and the Clean Water Act. The Safe Drinking Water Act, however, does contain provisions for controlling deep-well injection, which includes the disposal of toxic substances. The Resource Conservation and Recovery Act is somewhat different in that it controls hazardous wastes from their creation to their ultimate disposal. This "cradle-to-grave" management system, therefore, is designed to protect the air, surface water, groundwater, and the land from contamination by these wastes.

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Toxic Substances Control Act (TSCA) are product-control-oriented environmental laws. FIFRA regulates the use of pesticides which are unique since these chemicals are purposefully released into the environment specifically because of their toxic properties. TSCA, on the other hand, can regulate any toxic substance which is not specifically controlled by other federal laws. TSCA not only can limit the use of certain chemicals, but it also provides the authority to ban or limit production of those chemicals which pose an unreasonable risk to human health or the environment.

The summaries in Chapter 4 show that the total effect of these environmental laws, together with some of the other laws effecting toxic substances control, provide a fairly broad legislative basis from which to protect the environment. Congress is also considering a bill known as Superfund, which would establish a national fund to mitigate significant threats to human health or the environment from toxic chemicals and hazardous wastes. Superfund would therefore provide the authority to correct these hazards without relying on the solvency of the owner or on lengthy court proceedings.

PERIPHERAL STATUTES

In addition to the main environmental toxicant control laws which address entry and monitoring of toxics in the Great Lakes or which control their uses, several other federal statutes are also applicable to the control of toxic substances. Their main influence is with public health and safety. They do not provide for direct controls of toxicants in the Great Lakes Ecosystem and some have little impact on environmental toxicant programs. Others may indirectly affect entry of hazardous materials to the lakes by controlling their transportation and, thus, potential for accidental spills. Their main provisions are summarized in Chapter 4.

CANADIAN FEDERAL LEGISLATION

The major pieces of Canadian federal legislation that address toxic substances in the Great Lakes Basin are:

1. Environmental Contaminants Act

2. Clean Air Act

3. Fisheries Act

4. Transport of Dangerous Goods Act

5. Hazardous Products Act

6. Pest Control Products Act

7. Food and Drugs Act

Some acts, such as the Environmental Contaminants Act, deal directly with the control of toxics; others are not specific to toxics but do provide indirect controls. These acts are summarized in Chapter 5.

The acts fall generally into two categories, those that relate specifically to product controls and those which are more directed at controlling discharges or emissions to the environment.

The Pest Control Products Act and the Environmental Contaminants Act are primarily concerned with product controls. Although they both provide for thorough assessments of potential and real environmental and human health threats, they are of major importance to information-gathering processes. Both can be used to limit or restrict the uses of specific chemicals.

The Fisheries Act and the Clean Air Act also provide for some information gathering, but on a more limited scope than the Environmental Contaminants Act or the Pest Control Products Act. They are generally more oriented toward protecting the media receiving various types of wastes (atmospheric, liquid, solid).

Because these laws provide for various mechanisms to control toxic substances, either through limiting their use, import, or manufacture or by establishing specific environmental release limits, they tend to complement each other in offering overall protection for human health and the environment.

Another mechanism to effect toxic substances programs in Canada is through Cabinet directives based on demonstrated need, e.g. hazardous waste programs.

ONTARIO LEGISLATION

The acts in force in Ontario include:

1. Environmental Protection Act

2. Ontario Water Resources Act

3. Pesticides Act

4. Environmental Assessment Act

These acts are generally directed toward preservation of the environment and are not specific to toxic substances, although some are specific to the point that toxic substances are encompassed. The acts are discussed and other relevant acts listed in Chapter 6.

Ontario supplements several federal acts and enforces federal regulations. For example, Ontario's Pesticide Act is basically an enforcement tool based on the federal Pest Control Products Act, which classifies the compounds.

Provincial acts and regulations do not set out specific programs. However, they do give the powers to develop programs and projects based on need. The acts give the Lieutenant Governor in Council the powers to pass regulations, require research, give grants, and define levels of contaminants.

4 TOXIC SUBSTANCES LEGISLATION IN THE UNITED STATES

CLEAN WATER ACT

The Clean Water Act of 1977, which amended the Federal Water Pollution Control Act (FWPCA) of 1972, is currently the focus of activity in controlling toxic pollutants in the Great Lakes environment. The Act addresses each of the three lake-related categories: controls entry of toxic materials into the lake, provides for the measurement in the lake, and uses such measurements as a basis for controlling use of the lake. As such the Act is a complex and comprehensive law with features and interrelated programs within it. It emphasizes direct control of both toxic and non-toxic pollutant releases to surface water. The primary authority rests with the U.S. Environmental Protection Agency (EPA) and, to a lesser extent, the U.S. Army Corps of Engineers. EPA has delegated the authorities for the bulk of the programs under the Act to the eight Great Lakes states.

One of the unique features of the Clean Water Act is the specific attention given to the Great Lakes. Section 104(b) authorizes special ambient water quality and waste treatment studies to protect Great Lakes water quality. Section 108 of the Act authorizes expenditures for planning and demonstration of new pollutant control methods to remove and prevent entry of pollutants to the Great Lakes. The Corps of Engineers was authorized additional monies for Lake Erie to develop alternative waste control measures for point and nonpoint sources, as well as contaminated sediments.

The Clean Water Act has several basic programs which can be expressed directly in terms of the Toxic Substances Committee's framework and its information assessment and control program components. Additionally, there are several features of the Act that control toxic substances through control of more conventional contaminants.

Information is gathered from a variety of sources to conduct major assessment programs, including:

1. Federally approved state water quality standards

2. National technology-based effluent limitations

3. Area-wide water-quality planning under Section 208.

There are several distinct control programs which utilize information bases and assessments authorized under the Act. They include:

1. The National Pollutant Discharge Elimination System (NPDES) permit program

2. Pretreatment requirements which are closely related to the NPDES system

3. Dredge and fill restrictions for contaminated sediments

4. Section 311 spill control and emergency response provisions.

EPA conducts engineering assessments on various industrial processes which result in effluent guidelines. These guidelines currently provide technology-based performance standards for removal of given pollutants from 34 different industrial categories.

The state water quality standards are the second driving force behind control. If it is determined that the levels of discharge to a stream segment are such that water quality standards, with application of the effluent guidelines limitations, will not be achieved, effluent limits can be developed through a wasteload allocation for that segment. NPDES permits are then issued to the dischargers based on effluent guidelines or those derived from water quality standards, whichever is more stringent.

Additionally, the Clean Water Act provides for research studies, municipal treatment plant construction funding, data collection capability, and authority to establish and maintain monitoring and discharger data bases.

INFORMATION BASE

Information acquisition under the Clean Water Act basically serves three broad purposes: to provide the data bases for the various assessments, to monitor permit compliance, and to assess water quality standards compliance.

Extensive data are required to carry out the Act's various mandates including the establishment of federally approved state water quality standards, municipal treatment facilities planning, and development of technical rationale for control of toxic compounds. Based on a settlement of a lawsuit brought by the Natural Resources Defense Council, EPA was ordered to control 129 priority toxic pollutants. Subsequently, the 1977 amendments to the FWPCA embodied the court order into law. This action effectively sidestepped a lengthy technical background development process for the priority pollutants. Other toxic compounds, not part of the priority list, are currently undergoing the review and evaluation process.

Specifically for the Great Lakes, the Clean Water Act provides funding for research, monitoring, source data acquisition, and data management systems to evaluate the lakes and their potential for toxic contamination. These studies are conducted in four principal categories:

1. Fish flesh and sediments

2. Air deposition

3. Non-point water quality

4. Ambient water quality

These activities generate data on the actual levels and accumulation of specific chemical substances, in particular:

1. The identification and quantification of known and of previously undetected, potentially toxic, chemicals in the environment (fish flesh and sediments)

2. The identification of instances where environmental standards designed to protect health and to prevent transboundary damage to resources have been violated

3. The determination of trends in environmental concentrations of identified toxic chemicals in the Great Lakes Ecosystem as a measure of control program effectiveness.

These data are used to investigate potetial pathways for affecting human health. The atmosphere, Great Lakes tributaries, and sediments are monitored to determine their sources of toxic contamination. Ambient water concentration levels of trace metals and organic chemicals are measured. The fish monitoring and harbour sediment programs look for accumulation of these toxic substances. Discovery of significant concentrations of organic chemicals in fish and of both organic and inorganic contaminants in sediments trigger regulatory assessments by EPA to determine the sources of these pollutants. Control measures under the NPDES program, the Resource Conservation and Recovery Act, or the PCB regulations under the Toxic Substances Control Act are instituted where necessary.

In addition to the specially funded Great Lakes monitoring programs, the Clean Water Act regulatory programs require the acquisition of significant volumes of effluent and ambient water quality information. Compliance monitoring data are collected by states and by EPA in support of the NPDES permit program. To obtain the required data, dischargers are required to develop and provide to the state regulatory agencies and to EPA information regarding their discharges to surface waters. Information must be provided on the presence of 129 priority pollutants and on any other significant toxicants in the effluent. Furthermore, EPA and the states may require the discharger to provide detailed information on its manufacturing processes, raw materials, catalysts, and products. The regulatory agencies may require development of any additional data not currently available which are considered necessary to evaluate discharges and establish limitations. The information requested can include chemical and biological testing and industrial process evaluations, as well as product user lists. The discharger must allow the regulatory agency to enter, inspect, and sample its facility and inspect its records at any reasonable time. The states have developed computerized NPDES discharger and effluent information files to better track compliance of the NPDES permittees.

The NPDES permit program needs have spurred the development of a Great Lakes-specific data base Information System for Hazardous Organics in Water (ISHOW). It contains names of chemicals manufactured in the Great Lakes Basin as well as the manufacturer's location and information on the physical, chemical, bioaccumulative, and toxicological properties of these chemicals.

ASSESSMENT

A wide variety of assessments under the Clean Water Act are conducted which utilize the data base described in the previous section. The two most important are effluent guidelines and water quality standards development.

EPA has developed effluent guideline regulations for the wastewater discharges of 34 industrial categories, as well as municipal wastewater treatment. There are two general classifications of control stringency which result from these guidelines. The first and less stringent classification is best practicable technology, commonly called BPT. This classification only addresses a small number of toxic pollutants in addition to conventional suspended solids, oxygen demand, and pH controls. The second, more stringent category, is best available technology, or BAT, which mandates greater control of conventional pollutants and 129 first priority toxicants. BAT is essentially equivalent to BPT in the case of municipal treatment plants.

The Clean Water Act requires that standards be established to protect the use and value of U.S. waters for public water supplies; propagation of fish and wildlife; recreation; and agricultural, industrial, navigation, and other purposes. States are required to review standards at least once each three years and, as appropriate, modify them or adopt new standards in any case where such actions are necessary to meet the requirements of the Act.

These standards reflect the latest scientific knowledge on the kind and extent of all identifiable effects on health and welfare which may be expected for the presence of pollutants in water. In 1976, EPA issued "Quality Criteria for Water", which contains information concerning safe levels for both conventional and toxic pollutants to protect aquatic life, domestic water supply, irrigation, livestock watering, recreation, and aesthetic qualities. EPA policy requires the states to use the recommendations in "Quality Criteria for Water" when establishing specific numerical standards unless alternative general limits are justified. The policy also requires states to provide standards protection for public health and any uses which are actually made of the surface waters, and to establish a policy maintaining existing uses and prohibiting unnecessary degradation of high quality waters. The federal approval of state water quality standards ensures that the water quality objectives of the 1978 Great Lakes Water Quality Agreement are considered in setting state standards for the Great Lakes.

Section 208 calls for the designation of appropriate state and local agencies to conduct a process for areawide waste management planning. Plans are to be updated on a yearly basis. For the last two years the program has been essentially focused exclusively on nonpoint source problems.

In stream segments or bodies of water which do not attain the water quality standards, depsite control of discharges to the level required by the effluent guidelines, additional control may be used. The 208 planning agencies have been frequently involved in the development of wasteload allocations. These wasteload allocations, the effluent guidelines, and any more stringent requirements imposed by federally approved water quality standards form the basis of the NPDES permits and permit conditions issued to municipal and industrial dischargers.

To support these NPDES permit conditions, research is being conducted to focus on:

1. Process studies by industrial categories to determine the sources and quantities of toxic chemicals in wastewater

2. Toxic chemical treatment and destruction technology with the ultimate goal of developing zero toxic pollutant discharge technology. This includes funding demonstration projects in Great Lakes municipalities and at industrial facilities.

3. Fate and human health risk of toxic chemicals in the environment. The studies on the effect of PCB's on new mothers and their infants exposed to this and other chemicals by consumption of contaminated Great Lakes fish is one example in this category.

Most of this research is at the federal level. However, many ecological effect, risk, and demonstration projects are contracted to Great Lakes states' health or pollution control agencies.

CONTROL

The NPDES program controls the release of toxicants to surface waters through a national discharge permit system. The Great Lakes states have been delegated the authority to issue permits subject to federal review and veto. These permits specify the amounts of specific pollutants allowed to be released in the industrial or municipal effluent. These allowable pollutant quantities are determined by technology-based effluent guidelines or federally approved state water quality standards, whichever results in more stringent requirements.

At the national level, NPDES priorities are aimed at the major sources of the 129 priority pollutants. However, local and regional priority is also given to other toxicants from specific industrial sources which may cause human health or environmental harm. An example of regional priority would be the increased emphasis given to any nonbiodegradable organic chemicals in the Great Lakes. For the Great Lakes or other tributary waters of the region, broad fish scans and sediment analyses for organic chemicals, along with differentialization of industrial categories, are used to prioritize work efforts. Those specific industries with the highest potential for the discharge of toxicants are given first priority along with specific toxicants identified in tissue or sediment analyses.

Previous NPDES control efforts emphasized direct discharge abatement measures, with control of indirect industrial inputs of toxic and hazardous materials left up to the individual municipal treatment system operators. The Clean Water Act mandated a pretreatment program for industrial dischargers to municipal collection systems. This program is designed to eliminate the mixing of incompatible toxicants with biodegradable wastewater, to eliminate damage to municipal collection and treatment systems by strong indutrial effluent, and to minimize the contamination of sewage sludge with toxic materials. EPA has developed national pretreatment standards. The states having NPDES authority are required to institute pretreatment programs. The administration of such programs can be delegated to larger municipalities. Assistance to develop the necessary support facilities is available through the construction grants program. Currently, Minnesota is the only Great Lakes state having received pretreatment program delegation. New York, Wisconsin, and Illinois program applications are currently under review by EPA.

To ensure compliance with NPDES permit requirements and abatement schedules, the Clean Water Act provides civil and criminal penalties. The maximum civil penalty is $10,000 per day per violation and up to one year in jail for those previously convicted of NPDES violations.

The state pollution control agencies are required to have specific legislative authority before they can apply for and receive delegated federal authority to administer the NPDES program. All of the Great Lakes states have been delegated the NPDES permit program and have the primary responsibility for its implementation and enforcement. EPA maintains an overview with permit veto authority to ensure that, as a minimum, EPA national effluent guidelines and federally approved state water quality standards are met by the discharge permit conditions. Only Illinois has concentration-based effluent requirements for toxic and conventional pollutants that at times may be more stringent than those required under federal guidelines.

SPECIFIC ACTIVITIES

HAZARDOUS SUBSTANCE REGULATION

Section 311 of the Clean Water Act provides that there be no discharges of oil or hazardous substances into or upon the waters of the United States. The Act charged the Administrator of EPA with developing a list of hazardous substances by regulation, with appropriate penalties for their discharge.

The final regulation designating the hazardous substances, reportable quantities, and penalty structures was published on August 29, 1979. This regulation established a mechanism for use of the federal revolving funds for clean-up or mitigation of damage from hazardous substances spilled into the water of the United States. Further regultions will be developed for prevention of hazardous substances spills. These regulations will be similar to those for oil.

The cleanup of oil and/or hazardous substances spills into the Great Lakes is handled by the nation in which the spill occurred. The nation responsible for such a spill designates an on-scene coordinator, who supervises and directs the clean-up operation.

A major, concerted effort has been initiated to locate and clean up abandoned disposal sites containing hazardous substances. Cleanup of these sites through the authority in Section 311 will reduce the leaching and seepage of contaminants to the Great Lakes and their tributaries. The U.S. Coast Guard can be requested under Section 311 to provide federal funding for immediate clean-up or control of the toxic chemicals. This authority has been used on a number of occasions in the Great Lakes Basin.

The states have comparable spill response mechanisms within their borders. The ability to respond to toxic chemical releases, however, varies widely as a function of the nature of the release (e.g. spill, hazardous waste site) and staffing.

CONTAMINATED SEDIMENTS

Section 404 authorized the Corps of Engineers to issue permits for the discharge of dredged or fill material into the navigable waters of the U.S. at specified disposal sites. Permits are issued through the application of guidelines developed jointly by EPA and the Corps. The discharges must comply with applicable effluent standards, and prohibitions and limitations are monitored by Corps and/or EPA inspectors on a periodic basis or in response to public complaint. Permit conditions and limitations are enforceable through orders issued by the Corps of Engineers or by civil or criminal action. EPA has concurrent enforcement authority under Section 309 of the Act. The Act provides for maximum fines of $10,000 per day, while criminal provisions allow for a maximum fine of $50,000 per day and up to two years in jail for a previous offender.

The Clean Water Act provides for the transfer of Section 404 permit programs in areas outside the traditional federal navigation interests. No Great Lakes state has received or requested such program authority at this time.

CLEAN AIR ACT

The Clean Air Act and its subsequent amendments provide the basic federal statutory provisions for control of air contaminants. As a result of this legislation, ambient air standards and/or emission limitations have been set for seven "criteria" pollutants (particulate matter, sulfur dioxide, oxides of nitrogen, carbon monoxide, ozone, hydrocarbon, and lead) and, currently, for four hazardous pollutants (asbestos, beryllium, mercury, vinyl chloride), with standards in progress for benzene, radionuclides, and inorganic arsenic. Although these limitations are directed at the protection of human health, they affect the Great Lakes and other surface waters by reducing atmospheric deposition of pollutants into those waters.

The authority to implement provisions of the Clean Air Act for the regulation of toxic air emissions is vested within EPA. EPA has delegated authority for the enforcement of the existing NESHAPS program (National Emission Standards for Hazardous Air Pollutants) to Minnesota, Pennsylvania, and Indiana. Partial authority to control some toxicants (beryllium, mercury, and arsenic) has been delegated to Michigan and Wisconsin. No authority has yet been delegated to Illinois, New York, and Ohio.

The provisions of the federal and state legislation, regulations, and programs as related to the three component parts of the framework, are described below.

INFORMATION BASE

In order to carry out the legislative mandate for controlling air toxicants, the Clean Air Act provides EPA the authority for collection of the necessary data base. Section 114 of the Act provides for the establishment, maintenance, and reporting of inventories on source process operations and materials pre-manufacture, the instrumentation to measure source emissions and ambient air quality (the method, location, and intervals of such measurements

may also be prescribed), and any other information that may reasonably be required to establish the necessary control programs. In addition, each state has similar legal authority for collecting required data bases incorporated within their respective air pollution control plans.

There are no specific provisions limiting data acquisition. If a source wishes to claim confidentiality on the use of specific data requested by EPA, the source can do so by providing an adequate argument that the data would divulge methods or processes that would endanger the protection of company trade secrets if made public. For such circumstances, the data requested would still be required to be submitted, but would be held in confidence by EPA.

The Act does not contain any specific provisions requiring the priority ranking or scoring of substances for the purpose of control. However, the procedures recently proposed under EPA's Air Carcinogen Policy incorporate ranking or scoring methods for the listing of carcinogenic air contaminants for regulation under NESHAPS.

The federal prevention of significant deterioration (PSD) regulations require new or modified sources of all air pollutants regulated under the Act to meet specified control technology or air quality targets before such a source is granted a construction permit. Exemption from certain requirements or reviews is granted sources meeting specified minimal emission or air quality levels.

In the event that necessary scientific information is not available to carry out provisions of the Act, Section 103 of the Act provides the authority for EPA to establish a national research and development program to collect the required scientific information.

Most of the data gathered from industrial emissions sources are actually gathered by state and local agencies operating under delegations by EPA. Therefore, virtually all data acquisition capabilities under the Act are available to and, in fact, used by the states. EPA and the states share data on both a routine and an as-requested basis.

There are currently several federal activities to gather toxicant data relative to the Great Lakes. One is a program funded under the Clean Water Act establishing monitoring stations in all the lakes (except Lake Ontario) to measure the atmospheric deposition of airborne toxicants. Another project is a comprehensive inventory of fugitive emissions in areas potentially affecting the Great Lakes.

ASSESSMENT

Assessment procedures include a preliminary assessment of health risks, followed by a quantitative risk assessment of those pollutants that have been ranked as high-priority substances for control. The preliminary assessment of health risks involves the identification of candidate substances, screening of those substances, and a qualitative risk evaluation. The identification process includes searches of scientific literature, monitoring studies, and biological assays of substances found in the ambient air and from source

emissions. The process of identification involves soliciting input from other federal and state agencies, as well as public testing, private research groups, and other scientific sources.

The second step, screening, involves the evaluation of the potential extent of exposure of the candidate substance to the general public through the air media. The screening includes an analysis of production, uses, properties, air concentrations, and other indices used in determining the qualitative nature of exposure. Evaluation of substances presenting the greatest potential apparent public exposure will be given the greatest priority for further examination. A cursory or preliminary risk assessment is then performed by evaluating the probability that the candidate substance poses a toxicological human risk and by evaluating the extent of human exposure to those substances ranked as having high probability for causing human health hazards.

A recent example of this assessment process is the proposed Air Carcinogen Policy. This policy outlines procedures similar to the above for identification and assessment of potential air carcinogens. These assessments will form part of the technical basis for control of targeted potential air carcinogens.

Ecological and cost-benefit analyses are not presently factored into the assessment process. While states have a major role in information acquisition and manipulation, they perform very few, if any, assessments. These are mostly carried out by EPA at the federal level.

CONTROL

The present federal regulatory framework does not specifically exclude from control any substance determined to pose a significant human risk. Exceptions to this rule would include chemicals that were being phased out of production or for substances that have been determined to have a small atmospheric residence time in the chemical phase which poses a significant risk. Other chemicals may be added as the identification and assessment process demonstrates significant risks and control bases.

The control programs are generally in the form of an emission limitation at the source. Standards in a generic format (multi-source coverage based upon general types of source processes or operations) have been proposed for consideration under the Air Carcinogen Policy. No outright chemical usage bans are being implemented at the federal level under the Act.

Scientific control programs under various sections of the Act include Section 112. NESHAPS requires the EPA Administrator to list air contaminants that have been determined to impose a significant health risk (causes or contributes to an increase in mortality or serious irreversible or incapacitating reversible, illness). Emission standards for the appropriate source categories releasing these contaminants are required to be developed, published, and enforced. Hazardous pollutants presently regulated under NESHAPS include asbestos, beryllium, mercury, and vinyl chloride. Pollutants presently listed for future emission standards development are benzene, radionuclides, and inorganic arsenic.

Section III(a), source category performance standards, requires the control of new and existing sources that cause and contribute air pollution which may reasonably be anticipated to endanger public health or welfare. Pollutants presently covered by this section include fluorides, sulfuric acid mist, total reduced sulfur, and reduced sulfur compounds.

Section 303, emergency power, provides EPA with emergency response provisions allowing the Administrator to take extraordinary action when there exists evidence of "imminent and substanctial endangerment to the health of persons." If the Administrator determines that such "imminent and substantial endangerment" exists, and the affected state has not acted, EPA may either file a civil action or may issue an emergency shut-down order. Not only is Section 303 important in emergency situations involving criteria pollutants, but it may also have considerable utility in similar situations involving non-criteria pollutants.

Section 304 of the Clean Air Act permits citizens to bring civil suits in the United States District Courts under three sets of circumstances.

1. Citizens' suits may be brought in cases in which "any person" is alleged to be in violation of an emission standard or limitation, or in violation of a federal or state administrative order relating to such a standard or limitation.

2. A 304 action may be brought against the Administrator for an alleged failure to perform any non-discretionary act or duty required by the Act.

3. A 304 action is proper when a new or modified source has allegedly violated a PSC or nonattainment permit.

Section 304 imposes notice requirements on parties seeking to file citizens' suits, but the section also provides that a court may require a violating source, or the government as the case may be, to pay the plaintiff's costs of litigation including reasonable attorney and expert witness fees.

Finally, with regard to the regulation of chemical carcinogens, a number of separate statutes, including the Clean Air Act, empower several federal agencies to limit human exposure to carcinogens. In order to avoid inconsistent approaches and the duplication of effort in the control of cancer-causing agents, the president's regulatory council has given high priority to the development of a uniform carcinogen control policy. Within this framework, EPA has recently proposed a policy and procedures addressing the identification and control of airborne carcinogens emitted from stationary sources. This policy is intended to be used with existing provisions in the Act (e.g. Section 112).

Regarding state programs, EPA operating year guidance for 1981 has raised NESHAP's priority from a "2" in 1980 to a "1" for 1981 for all states. All states are to identify NESHAP violators, total NESHAP source populations, and commit to taking the necessary legal administrative actions to rectify violations.

RESOURCE CONSERVATION AND RECOVERY ACT

Subtitle C of the Resource Conservation and Recovery Act of 1976, as amended (RCRA) establishes a federal program to provide comprehensive regulation of hazardous waste to protect human health and the environment. When fully implemented, this program will provide "crade to grave" regulation of hazardous waste. RCRA directs EPA to promulgate regulations for implementing the Act and allows states to receive authorization to operate state programs in lieu of the federal program where these programs are equivalent.

EPA promulgated regulations in February and May of 1980, initiating the implementation of the RCRA's provisions. These regulations define hazardous wastes and establish standards for generators and transporters who handle these wastes. A manifest system for tracking these wastes was also established, having been developed in cooperation with the Department of Transportation (DOT). An agreement for implementing transporter requirements has been signed by EPA and DOT. These regulations also established standards for facilities which treat, store, or dispose of hazardous wastes, and establish a permit system for these facilities. Regulations regarding the authorization of state programs to carry out the program were also issued. Finally, the regulations also require that all persons engaged in any activity subject to the control of these regulations must notify the EPA or an authorized state of their activities. These regulations will become fully effective on November 19, 1980. EPA will be amending these regulations, however, increasing the universe of wastes determined to be hazardous under the regulations as more information becomes available. In addition, more extensive standards for facilities will be promulgated.

Hazardous wastes have been defined in the regulations by both characteristics (ignitable, corrosive, reactive, and toxic) and by listing. Hazardous wastes include wastes which can be toxic, carcinogenic, mutagenic, or teratogenic. This program, therefore, promises to have a significant mitigating impact on the amount of toxic material entering the Great Lakes by establishing a national management system designed to control waste handling, and preclude the entry of hazardous wastes into surface waters, groundwater, and air. In addition, the disposal of any material dredged from the lakes, if found to be hazardous, would need to comply with the RCRA regulations.

Since threats to human health and the environment from mismanaged hazardous wastes have become a significant concern in the United States, federal action to mitigate these threats has begun prior to the promulgation of the RCRA regulations. The program involving activities directed toward discovery and initation of corrective action, is referred to as the uncontrolled site program. In this program, potentially dangerous waste sites are discovered by any means available (e.g. by existing state and federal records, citizen complaints, congressional investigations). This information is reviewed by staff with expertise in waste sites, groundwater, surface water, air, surveillance, and the various enforcement mechanisms at the disposal of EPA via all the U.S. laws discussed in this presentation. Of particular value have been enforcement capabilities under the Clean Water Act, the Toxic Substances Control Act, and Section 7003 of RCRA. Sites are evaluated and corrective actions are initiated in conjunction with the

states. These corrective actions include enforcement actions and jurisdictionally funded cleanup, as well as owner/operator-initiated cleanup. This uncontrolled site program is serving as a precursor to both the implementation of the RCRA regulations, as well as Superfund, the common name of a bill in Congress to establish a federal program to quickly pay for site cleanup where public health or the environment is threatened by hazardous wastes.

Although each of the Great Lakes states has notified EPA of its intent to seek authorization to implement the control program established under RCRA, no state can receive interim authorization (the first step in the authorization process) until after the national regulations become effective on November 19, 1980. In addition, many of the states are now promulgating or modifying regulations in order to receive interim authorization. In order to clearly present existing state authorities relative to those under development to receive authorization, specific discussions have been completed for each of the states. These presentations follow the framework used to describe the federal program.

INFORMATION BASE

RCRA provides the authority for establishing a substantial data base for implementing the program. In the process of developing the listing of wastes which appear in the regulations, EPA has compiled evaluations on a large number of wastes; this is in addition to those covered by the characteristics. At present, some 446 wastes are listed. The number of wastes listed will increase as more data become available and are evaluated for the waste's ability to adversely affect human health and the environment. This process of priority ranking wastes, which yielded the original listing, will also be used to adjust the threshold generation rate which is presently set at 1,000 kg per month for the less hazardous wastes and reaches as low as 1 kg per month for those considered acutely hazardous. The threshold generation rate is the rate of waste generation which, if equalled or exceeded during any month, requires the generator to meet all appropriate regulations for managing hazardous wastes.

In addition to the listing of wastes, EPA is compiling an exhaustive inventory of all entities which handle hazardous wastes. This inventory is based on the notification requirement where entities are required to notify EPA of their activities and of the wastes they handle. Any information available to EPA will be used to discover those who fail to notify. All notifications were due to EPA by August 18, 1980. Facilities which treat, store, or dispose of hazardous wastes must also file by November 19, 1980, permit applications further describing their activities, in order to continue operating. In addition to these significant efforts, EPA has developed a list of waste sites via its uncontrolled site program. This listing has been augmented by an inventory developed by the U.S. House of Representatives Subcommittee on Oversight and Investigations (Report dated October 1979).

Besides these activities specifically directed toward hazardous wastes, Subtitle D of RCRA directs the development of state-by-state assessments of all land disposal sites regardless of the type of waste they receive. This "open dump inventory" will characterize all waste sites according to specific

criteria. Although the vast majority of these sites will be excluded from regulation under the federal hazardous waste program, they can receive small quantities of toxic wastes for disposal. In fact, "hazardous wastes" which fall below the threshold generation rate must be disposed of at a nonhazardous waste facility which meets the Subtitle D criteria if they are not disposed of at hazardous waste facilities.

RCRA authorizes EPA to inspect, sample, and review all records of any persons subject to the law's provisions. In addition, annual reports are required from all generators and facilities. Information submitted to EPA is available to the public unless confidentiality is requested. These requests must meet certain criteria to be granted, but required data must be provided to EPA.

Other reporting requirements are included in the regulations involving the manifest system. In this system, a generator must initiate a manifest which accompanies the waste through transport to ultimate disposal. If the receiving facility does not return the manifest, the generator must file an "exception report" with EPA within 45 days stating this fact and indicating what efforts have been made to determine the cause of the lost manifest. Identification numbers are provided to generators, transporters, and facilities for the purpose of the manifest system, and no one may ship, transport, or receive hazardous wastes without this identification number. The generator is responsible for characterizing his waste and initiating the manifest. Facilities must establish groundwater monitoring programs within a year of the effective date of the reguations. Any data generated by this monitoring must be made available to EPA and, should any degradation of the groundwater quality be noted, a report must be filed.

RCRA does not directly preclude or limit the generation of hazardous waste. Once the waste is generated, however, it must be managed according to the regulations. RCRA also is expected to foster new innovation in the reduction of wastes presently being generated. This assumption reflects the existing situation where many wastes are handled improperly, costing the generator little for disposal. As the regulations take effect, the cost to these genertors will increase, and a greater economic incentive will exist to reduce the quantities of waste generated.

RCRA gives the EPA the authority to conduct research in many areas concerning hazardous wastes. These areas include studies of adverse health effects, impacts on the environment, management practices, technological improvements, and reuse and recovery of waste presently being generated.

ASSESSMENT

As mentioned earlier, EPA has, and continues to conduct a number of assessments in implementing RCRA. These assessments include evaluations of health effects, ecological impacts, population at risk, and cost-benefit analyses. The listing and characteristics of hazardous wastes for example, were established with certain production thresholds to reduce the impact of the program on the small generator and to establish a more readily managed initial program. Studies by EPA indicate that less than 10% of those who generate "hazardous wastes" must comply with all the promulgated regulations,

yet over 99% of all hazardous wastes generated in the U.S. will be controlled. As more data become available, additional wastes will be added to those covered by the regulations. Similarly, production levels above which generators must declare their wastes hazardous will be reduced to provide additional protection of the environment as warranted.

The information generated by the annual reports from generators and facilities will be used to help determine how wastes are being handled, if there are apparent shortfalls in capacity, as well as the overall effectiveness of the program. Assessments of the impact on the regulated community, as well as the protection of the environment will continue as more information becomes available to EPA, via the various data-gathering and research activities presently underway.

CONTROL

There are four basic types of hazardous wastes controlled under RCRA regulations. Wastes from non-specific and specific sources are two of the types (e.g. spent degreasing solvents and emission control dust from secondary iron smelting, respectively). Commercial chemical products and off-specification species to be discarded are another. These three types are presented in lists which describe the wastes. The other type of waste is a hazardous waste based on whether it is ignitable, corrosive, reactive, or toxic (based on the leachable materials in the waste). RCRA does not include authority over source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended. Also, point-source wastewater discharges covered by the Clean Water Act are not controlled.

The control mechanisms which are authorized under RCRA include the manifest system which controls all shipping and disposal of hazardous wastes; the permit system which sets specific requirements for facilities; interim status standards which must be complied with by the facilities until they receive their permits; and self-reporting, additional EPA-directed reporting, and EPA's own authority to inspect and sample. In addition, annual reports presenting the amount of waste generated and disposed of will greatly improve EPA's ability to assess the impact of existing controls as well as the adequacy of available disposal.

EPA has the ability to enforce all of these regulatory provisions. Enforcement may be administrative or judicial, including both civil and criminal actions. Civil suits may seek up to $25,000 per day for each day of noncompliance, while criminal penalties may reach $50,000 per day of violation, or imprisonment for not more than two years, or both, in the case of second convictions.

STATE LEGISLATION AND PROGRAMS

ILLINOIS

The Environmental Protection Act, as amended (January 1, 1980), designates the Illinois Environmental Protection Agency (IEPA) as the solid waste agency. The Illinois Pollution Control Board Rules and Regulations, Chapter 9, also relate to the contol of toxic wastes. In addition, the IEPA is

currently writing rules to ensure that the state's hazardous waste management program more closely conforms to the federal program.

The Environmental Protection Act mandates IEPA to collect and disseminate information, acquire technical data, conduct experiments, monitor environmental quality, analyze samples from each public water supply, and establish a program of continuing surveillance, inspection, and investigation. The Act authorizes IEPA to promulgate standards and reporting requirements. Hazardous waste facilities are required to submit periodic reports and to allow access to records and sites for review and inspection. Under the rules and regulations (Chapter 9), transporters are not required to meet the reporting requirements specified under RCRA. The Act includes a confidentiality provision, but makes all information available to the state agency. The Illinois manifest system is currently in effect and is comparable to the federal system. Special waste haulers, which include hazardous waste haulers, must be permitted. Facilities also are required to obtain construction permits and operating permits.

Chapter 9 adopts the criteria, characteristics, and lists under Section 3001 of RCRA by reference. IEPA has issued hazardous waste criteria (Rules 1-3) which are deficient in some areas. Illinois is currently revising these criteria and intends to adopt the hazardous waste criteria, characteristics, and lists under Section 3001 (Part 261) by incorporation. To control the hazardous wastes covered, Illinois has regulations, a manifest system, and a permitting system.

In addition, Illinos bans any discharges or deposits of contaminants and requires that hazardous waste facilities be located at least one thousand feet from private wells and public water supplies. Closure and financial responsibility requirements are identical to federal requirements. Penalties for violations are comparable to federal requirements.

INDIANA

The Environmental Management Act, as amended (March 3, 1980), designates the Indiana Environmental Management Board (IEMB) as the solid waste agency and the Stream Pollution Control Board as the water pollution agency for the state. Indiana is currently writing regulations covering generators, transporters, and treatment, storage, and disposal facilities, as authorized by the Act.

A comparative analysis of RCRA and Indiana's statutes and regulations cannot be completed until the regulations are developed and finalized.

IEMB is authorized to conduct ongoing surveillance and inspection of solid waste management sites and public water supplies and, under this authority, can establish and administer monitoring, reporting, and inspection requirements as it deems necessary.

The Environmental Management Act contains a confidentiality provision which allows authorized state or federal representatives to review all information. The Act also gives the IEMB authority to establish a permitting

system for discharges of contaminants and for hazardous waste facilities which must be in effect on or before July 1, 1981.

IEMB is mandated to develop criteria to identify hazardous wastes in part by assessing action of adjoining states and the federal government for the purpose of developing uniform criteria. Other agencies must report any actions or information affecting the environment to IEMB.

In addition to the above, IEMB must develop criteria based on characteristics and lists as established by EPA. The Act authorizes IEMB to promulgate regulations covering a permitting system and a manifest system, as well as other standards and procedures. The manifest system authorized by the Act must follow the federal system under RCRA.

To enforce the Act and regulations promulgated under the Act, IEMB is authorized to investigate violations and can issue administrative orders or sue violators in court. Civil and criminal penalties comparable to those under RCRA are in effect.

MICHIGAN

Act No. 64, the Hazardous Waste Management Act (January 1, 1980), designates the Michigan Department of Natural Resources as the hazardous waste management agency and creates a state Hazardous Waste Management Planning Committee. Michigan has issued proposed rules under the Act and is in the process of accepting and responding to public comments. Requirements under the Act may be compared to federal requirements, but it would not be entirely accurate to compare Michigan's regulations until they are finalized.

The Hazardous Waste Management Planning Committee is mandated to complete a hazardous waste management plan within two years of the effective date of the Act. The plan is to include inventory and evaluation of sources, types and quantities of hazardous waste, inventory and evaluation of hazardous waste management practices and costs, projection of needs, and other studies as necessary.

Generators are required to maintain records on the quantities, characteristics, and composition of hazardous wastes generated and submit monthly and periodic reports. Under a permitting system, hazardous waste facilities are required to submit environmental assessments, hydrogeological reports, leachate and groundwater monitoring reports, and monthly operations reports. Construction permits and operating licenses for hazardous waste facilities are authorized by the Act. Transporters of hazardous waste must obtain a license. The Act authorizes a manifest system. A confidentiality provision allows the state access to all information and data, but does not specifically mention the federal government.

Michigan's characteristics and lists must conform to RCRA's 3001 (Part 261) requirements, although the proposed rules exempt recyclables.

Michigan uses regulations, a permitting system, a manifest system, and standards to control hazardous waste. Interstate shipments of hazardous waste must go to approved facilities. The state is authorized to investigate

without a search warrant and penalties comparable to the penalties under RCRA are in effect. The Act gives primary enforcement authority in the event of a toxic substance emergency to the state Toxic Substance Control Commission.

MINNESOTA

The Waste Management Act, as amended (1980), designates the Minnesota Pollution Control Agency (MPCA) as the solid waste agency. Minnesota Rules, 6MCAR §4.9001 to §4.9010 are currently in effect.

The Waste Management Act requires MPCA to complete an environmental impact statement prior to approval of any hazardous waste sites. MPCA also is required to develop a statewide spill contingency plan and training standards. The Rules establish a disclosure procedure under which generators must submit yearly disclosures. Under treatment, storage, and disposal facilities standards, records of personnel training must be maintained. Additional records which must be maintained include groundwater monitoring, reports on subsurface conditions, operation plan reports, hazardous waste characteristics monthly summary, operation logs, and quarterly site monitoring reports. The monitoring reports are to include inventory and identification of hazardous wastes, air and groundwater quality, and management of wastes. Hazardous waste facilities must obtain construction permits and operating permits.

Transporters must report spills to MPCA, but are not required to meet the additional federal requirements. All transporters must be registered with MPCA. The Act authorizes a manifest system and the Rules establish this system. The MPCA requirements have minor deficiencies compared to the federal manifest system. Treatment, storage, and disposal facilities must have established safety and emergency procedures and are required to prevent discharges to surface water or groundwater.

The Rules may need changes to cover the hazardous wastes covered by Section 3001 (Part 261) of RCRA. Minnesota's control mechanisms include regulations, a permitting system, a manifest system, procedures, and standards. MPCA is authorized to investigate violations.

NEW YORK

The Environmental Conservation Law, Chapter 27, designates the New York State Department of Environmental Conservation (DEC) as the solid waste agency. DEC is assuming full delegation of the RCRA program.

The Environmental Conservation Law provides for development of a state-wide solid waste management plan, registering and permitting septic tank cleaners and industrial waste scavengers, permitting new solid waste management facilities, regulating all aspects of hazardous waste transportation and disposal in a manner consistent with RCRA, and developing criteria for siting hazardous waste treatment, storage, and disposal facilities. All these activities are underway. The Law also gives DEC authority to investigate old hazardous waste sites and to require remedial actions on the part of the owners. A cleanup fund for old hazardous waste sites has been established to be used when the Commissioner of Health declares that a threat to public health exists.

A manifest system is being developed under a special legislative appropriation, and a survey of hazardous waste generation and disposal has been completed. A survey of old hazardous waste sites was carried out in 1979 and is being updated as new information is collected. DEC is putting considerable effort into developing heightened management requirements for hazardous waste disposal operations to be imposed through air, water, and solid waste permitting programs. These include discharge of aqueous wastes only after lagooning and extensive chemical analyses, bioassays on discharges, stringent monitoring techniques, and permanent on-site inspectors.

OHIO

Act 266 designates the Ohio Environmental Protection Agency (OEPA) as the solid waste agency. Regulations administering Act 266 are in effect. Act 266 mandates that these regulations be no more stringent than any regulations issued under RCRA.

The Rules list priority pollutants. Act 266 authorizes OEPA to require generators to maintain records on the quantity, constituents, and chemical composition of hazardous wastes generated. OEPA can also require records of source and delivery points from transporters and reporting and monitoring from hazardous waste facilities. Additional reports and records may be required as necessary. The Rules require disclosure reports and annual reports from generators. Hazardous waste facilities must make emergency plans, training, and records available to OEPA. Facilities must also monitor the soil, air, surface water, and groundwater. Quarterly reports must be available for inspection and copying by OEPA. Additional reports and records which facilities must maintain include operation logs, monthly summaries, engineering reports, geological reports, and reports on operation and maintenance.

Act 266 authorizes a manifest system comparable to RCRA's. facilities must obtain permits for construction and operation, and transporters must register with OEPA. Confidential data may be disclosed as required by law.

Ohio's Rules cover substantially the same hazardous wastes as RCRA. Generators must give hazardous waste only to registered transporters, transporters must deliver shipments only to permitted facilities, and facilities must not accept shipments inconsistent with the manifest. Facilities must prevent discharges of hazardous waste to surface water or groundwater. Penalties are comparable to those under RCRA.

PENNSYLVANIA

Pennsylvania passed Act 97 in July 1980, to control hazardous waste activities. Act 97 was patterned after RCRA. The regulations for Act 97 were scheduled to be published on September 19, 1980, and to go into effect on November 19, 1980. The Pennsylvania regulations mirror RCRA, except Pennsylvania requires transporters to be licensed in order to carry hazardous wastes. The rest of the requirements are the same.

In the past, hazardous wastes were regulated under Act 241. This Act only governed disposal facilities which accepted hazardous wastes. The decision on granting a facility to handle hazardous waste was based on a case-by-case

basis using best engineering judgement. Act 241 expired on September 5, 1980; however, all the permits and other requirements stay in force until the regulations for Act 97 take effect on November 19, 1980.

WISCONSIN

Chapter 277, Laws of 1977 (Act), designates the Wisconsin Department of Natural Resources (WDNR) as the solid waste agency. Rules under this Act have been proposed but not approved. These proposed rules are being modified to be substantially equivalent to RCRA.

The Act authorizes WDNR to establish minimum standards for hazardous waste facilities and allows WDNR to prohibit particular methods for treatment or disposal of hazardous wastes. Facilities may be required to maintain records on personnel and training, waste and inspections, unmanifested wastes, accidents and spills, and monitoring. Quarterly reports may be required from facilities. Transporters and treatment, storage, and disposal facilities must be licensed. The Act authorizes WDNR to establish procedures for a manifest system. WDNR may coordinate management and regulation of hazardous wastes with other states. Proposed recordkeeping and reporting requirements are comparable to those under RCRA except transporters are only required to notify the state of any discharges in transit.

The Act mandates WDNR to promulgate, by rule, criteria identical to RCRA's Section 3001 (Part 216) for characteristics and lists. The characteristics and lists under the proposed rules are comparable to those under RCRA's regulations. Hazardous waste facilities must not discharge into navigable waters nor allow a detrimental effect on surface water quality. Penalties are comparable to those in effect under RCRA.

SAFE DRINKING WATER ACT

The Safe Drinking Water Act establishes the basis for regulations limiting toxic contaminants in drinking water. In relation to the Great Lakes, the emphasis of the Act is on controlling a use of the lakes, as the Act deals mainly with standards for water supplied to consumers rather than the raw water supply. The Act, can however, be used to affect entry of toxicants into the lakes in an emergency. Under the Act, sources contributing to elevated toxicant levels affecting drinking water systems can be ordered to limit their discharges. This is particularly germane to the Great Lakes as seventeen major U.S. cities and over eleven million people depend on the Great Lakes as their main drinking water supply.

The primary authority for implementation of the Act is with EPA. EPA has largely delegated authority to individual state programs.

INFORMATION BASE

The EPA and state programs maintain inventories of all public water systems serving 25 or more persons. These systems are required to do different levels of monitoring based on their size and potential for contamination. These data are regularly transmitted to the state programs and to EPA, which also conducts field reconnaissance analyses which may detect various toxicants. Where toxicants are suspected to be significantly

affecting a water supply, appropriate ambient analyses are conducted and process and discharger data are reviewed to identify the source of the contamination.

Due to the importance of standard laboratory practices and quality assurance, EPA has an extensive certification program for laboratories. All samples done by contractors must be through certified labs.

ASSESSMENT

Different types and levels of assessments are carried out by the various programs implementing the Safe Drinking Water Act. The Office of Drinking Water, at EPA headquarters, has established a Criteria and Standards Division which evaluates the short- and long-term effects of specific chemicals. This office also establishes maximum concentration levels (MCL's) for chemicals found or likely to occur in water supplies. These MCL's are established as enforceable limitations under the Act.

States and larger local authorities routinely evaluate the capability of water treatment facilities to remove various toxicants and their ability to pass through the treatment works. Monitoring data are also evaluated to record levels in excess of MCL's and to identify drinking water systems having potential public health problems.

CONTROL

Control programs under the Safe Drinking Water Act are triggered by violations of the MCL's. Primarily these control programs focus on limiting or stopping use of the water by alerting the public as to the hazards involved. For groundwater, an aquifer can be declared protected to eliminate injections or surface disposals affecting its use as a drinking water source. In clear and immediate danger situations caused by contamination of drinking waters, dischargers of toxic materials can be prohibited from continued emissions under the Act.

FEDERAL INSECTICIDE, FUNGICIDE, AND RODENTICIDE ACT

Pesticides have the distinction of being one of the few classes of toxic substances to be intentionally released into the environment. This puts pesticides in a unique class in regard to risk/benefit analyses and regulatory decisions. Permissible and lawful use accounts for the major portion of the pesticide load in the environment, including drainage into the Great Lakes. This being the case, registration becomes the most important control mechanism. Aside from this indirect control of pesticide entry into the lakes and requirements for extensive testing of pesticide chemicals, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) does not provide for direct control on uses of the lakes.

The 1972 amendments to FIFRA called for states and EPA to implement registration, production, distribution, and use provisions for pesticides. Each state named its Department of Agriculture as the lead agency for these and other related responsibilities, and legislated revisions to their

pesticide statute to ensure that they had the necessary authorities to carry out the new programs.

INFORMATION BASE

Since the major provision of FIFRA is its Section 3, pesticide registration, the bulk of EPA's information bases is data submitted to obtain registration. The pesticide registration process requires the disclosure of all manufacturing procedures, equipment used, and the source and composition of all ingredients which compose the finished product, including both domestic and imported pesticides. Section 9 of FIFRA authorizes the inspection and sampling of pesticides at any establishment where pesticides are held for sale or distribution. This authority extends only to that area of the firm where the products are stored or warehoused. Because of these limits, the Consumer Product Safety Commission, Food and Drug Administration, Occupational Safety and Health Administration, and EPA have formed an Interagency Regulatory Liaison Group (IRLG) to allow for cross-jurisdictional reporting of potential problems in the manufacture and use of pesticides. With the exception of confidential information, all data developed to support the application for registration are available to environmental review groups, citizen groups, and to any body or political subdivision. Approximately 35,000 pesticide products, representing about 1,500 chemicals, are currently registered under FIFRA.

If, in this process, a product or product use appears to have unreasonable risks, it undergoes the critical review of the Rebuttable Presumption Against Registration (RPAR) process. The RPAR process is a ranking of pesticides from which various registration, cancellation, or enforcement actions may be initiated. Section 6 of FIFRA requires the registrant to report additional factual information regarding unreasonable adverse effects on the environment, thus adding to the data base.

Section 7 of FIFRA requires the registration of all entities that produce pesticide chemicals or devices. Part of this process requires reporting on annual production and amounts sold or distributed. While this does not include remaining inventory, it does specifically give the amount of each pesticide entering trade or use channels. Production information is not available to the public except through a public proceeding.

Section 20 of FIFRA directs that the Administrator of EPA shall conduct research and formulate a periodically revised national plan for monitoring pesticides. This includes monitoring in air, soil, water, man, plants, and animals as may be necessary. These procedures include the identification of the sources of contamination and their relationship to human and environmental effects. These activities are to be carried out in cooperation with other federal, state, and local agencies. Grants and contracts often support these activities.

Several major monitoring studies and pesticide reviews are currently in progress, including pesticide use in the Phoenix, Arizone area, 2,4,5-T cancellation proceedings, ultra-low-volume pesticide application by aerial applicators, spruce budworm and gypsy moth control programs, and herbicide use in the forest, to name a few. Activities such as these are expected to gain

momentum in the future as EPA and the states gain a better understanding of the impact of pesticides on human health and the environment.

ASSESSMENT

EPA makes a number of scientific/regulatory judgements in the regulation of pesticide products: pre-market screening, use limitations, and marketplace removal. These program features are either based on special assessments or are assessments in themselves.

The most comprehensive pre-market screening program is section 3 - Registration. Registration is a use-by-use review of the adverse and beneficial effects of a proposed pesticide.

Environmental Use Permits allow limited use of unregistered pesticides to facilitate the gathering of registration support data. Poundage, sites allowed, and disposition of treated crop are the principal conditions placed on such permits.

The use-related assessment program for pesticide regulation is classification. Under classification, EPA divides pesticides into two groups, those for use by public-at-large (general use), and those for use only by competent users (restricted use). Criteria used in classifying pesticides include acute human toxicity and accident history. About forty pesticide ingredients now have some or all uses classified as restricted.

The mechanism for screening already registered products for previously undisclosed adverse effects is the RPAR process. In RPAR, pesticides for which adverse effects exceed criteria in regulations are identified and reviewed to determine the validity of the adverse effects studies. If these studies appear valid, EPA challenges pesticide registrants to demonstrate why the pesticide should continue to be registered.

CONTROL

FIFRA exercises a variety of control mechanisms over pesticides. These fall into six broad categories: registration, classification/certification, production, distribution, use, and cancellation/suspension. Additionally, FIFRA contains a wide variety of enforcement tools ranging from warning letters to injunctive relief, to ensure compliance with the regulations.

Pesticide registration is foremost among the control programs. The individual registered product is regulated from the point of production through distribution in commerce, sale, and end use by the consumer, with the label being the vehicle that ultimately governs its use. This program has evolved from a product-by-product review of primarily efficacy data to support label claims, to a sophisticated review of registration standards which address product chemistry, environmental fate, toxicology, residue chemistry, ecological effects, regulatory rationale, and numerous other major categories.

Included in registration control is the RPAR. If EPA receives or develops information indicating problems with an existing pesticide, it presumes this pesticide should not be registered, and can require the manufacturer to, in

effect, prove that his product does not pose unreasonable risks. Pesticides which fail to rebut this presumption are then slated for cancellation.

Classification/certification is perhaps the most significant mechanism for protecting human health and reducing direct exposure of the environment to pesticides through over-application, carelessness, ignorance, or accident. Two key regulatory provisions which affect pesticide users are classification or pesticides under Section 3(d) for either general use or restricted use, and certificiation of applicators under Section 4 as competent to use restricted-use products.

General use products are those that will not ordinarily impact human health or cause unreasonable adverse effects on the environment when used according to label directions. These products are available to the general public. Restricted use pesticides are those which may cause adverse effects on the environment and are available for use only by competent persons (certified applicators) who have shown their ability to use these products safely and effectively. Applicator certification programs are carried out by the states under EPA standards.

Section 7 of FIFRA requires that all pesticide-producing establishments be registered with EPA and that production reports be submitted annually. The purpose of these requirements is to:

1. Identify the production site at which a pesticide was produced

2. Provide for more efficient monitoring of pesticide production

3. Identify the production site in the event it is necessary to recall or stop the sale of pesticides due to adverse effects to humans and the environment through accident, willful misuse of pesticides, mishandling, or other adverse actions

4. Determine total quantities and types of pesticide chemicals introduced into the environment.

Section 3 of FIFRA requires that pesticides sold in the United States be registered and bear required labeling such as an ingredient statement, net contents, adequate directions, and cautions. All modes of sale (interstate, intrastate, and over the counter) are subject to regulation.

Label directions and caution statements on all pesticides are designed to prevent injury to man and the environment. Section 12(a)(2)(G) of FIFRA makes use inconsistent with the label (misuse) an unlawful act. Use is defined in the regulations as any act of handling or release of a pesticide, or exposure of man or the environment to a pesticide through acts, including but not limited to:

1. Application including mixing, loading, and any required supervisory action in or near the area of application

2. Storage actions for pesticides and pesticide containers

3. Disposal actions for pesticides and pesticide containers.

Section 6 of FIFRA provides authority for cancellation and suspension action for previously registered products. The Administrator of EPA may issue a notice of intent to cancel if it appears, on the basis of new information, that a pesticide or its labeling no longer comply with the provisions of FIFRA or, when used according to widespread and commonly recognized practice, the pesticide generally causes unreasonable adverse effects on the environment. If the Administrator determines that action is necessary to prevent an imminent hazard, he may suspend the registration of a pesticide immediately, pending completion of cancellation hearings.

FIFRA provides for several types of enforcement-orientated activities, including inspection and sampling at establishments where pesticides are produced and distributed, and inspections of records of production. In all, there are more than 22 actions representing about sixty possible violations specified by the law. Stop-sale orders and product seizures of violating pesticides are allowed. Civil and criminal fines of $5,000 and $25,000, respectively, are specified for major violations, while minor infractions are usually handled by warning letters.

Section 24(c) - Special Local Needs Registration - permits state pesticide authorities to allow pesticide uses not registered by EPA. Registration data requirements are the same as those for federal registration with respect to hazards, but the state is free to establish its own standards of effectiveness. States may not register new pesticide ingredients, nor register uses which violate pesticide tolerance standards.

Section 18 of FIFRA provides EPA with the authority to waive registration for pest control emergencies. These emergencies principally involve unforeseen pest outbreaks with serious economic consequences, agricultural quarantine, or public health emergencies.

Section 26 of FIFRA authorizes the Administrator of EPA to grant primary enforcement responsibility for pesticide use violations to states. All of the Great Lakes states except Ohio have been granted use enforcement primacy. The majority of the pesticide enforcement program (inspections, samples, cases) is carried out by the states under the cooperative agreements/grants and under use primacy. EPA is involved in some special sampling activities, continues to run the establishment registration program, maintains a minimal enforcement program in Ohio, and processes cases the states cannot or do not handle. These activities, which are in addition to agreement/grant oversight and maintenance, continue to generate a small number of EPA regional enforcement cases each year.

All of the Great Lakes states have pesticide statutes that regulate the sale and use of pesticides. With the exception of Indiana (State Chemists' Office) and New York (Department of Environmental Conservation), the Department of Agriculture administers the basic pesticide statute and regulations, while agencies such as natural resources, health, and environmental protection are responsible for monitoring activities as they relate to the overall objectives of their programs.

Information base data, program assessments, and the various evaluation techniques are all interrelated. Major problems emphasis evolves primarily from the registration and certification programs and the accomplishments and deficiencies emanating from these activities. These control features are enforced in a manner very similar to those which EPA uses to enforce FIFRA. The reason for this is because of the similarity between the state and federal programs that has evolved following the 1972, 1975, and 1978 amendments to FIFRA, in which Congress made it possible for the states to assume certain federal responsibilities through the state pesticide applicator certification program and enforcement agreements. Each state has numerous enforcement officers in the field to investigate pesticide incidents.

TOXIC SUBSTANCES CONTROL ACT

The Toxic Substances Control Act (TSCA) is that element of federal legislation dealing exclusively with the control of toxic substances in the environment. TSCA's primary purpose is to enable EPA to assess hazards associated with a particular chemical prior to its introduction into commerce and to evaluate human health effects of existing chemicals.

In this respect, TSCA affects the entry of toxic or hazardous chemicals into the Great Lakes. While TSCA does not control any uses of the lakes, nor provides for any direct monitoring, it does establish a comprehensive premanufacture screening program. This program attempts to prevent the manufacture and distribution of new chemicals or new uses of existing chemicals without an assessment of their potential risks. As the lead agency for TSCA implementation, EPA can require extensive testing of potentially toxic substances or practices.

TSCA has a unique relationship to the myriad of other U.S. laws covering toxic or hazardous substances. First, TSCA covers only materials in commerce, or products. This differentiates it from acts such as the Resource Conservation and Recovery Act, the Clean Air Act, or the Clean Water Act, all of which deal primarily with wastes or effluents. TSCA is an umbrella act, covering substances not covered by product laws such as the Federal Insecticide, Fungicide, and Rodenticide Act or the various consumer product safety and food and drug acts.

INFORMATION BASE

TSCA provides for the development of an inventory of chemical substances manufactured in or imported into the U.S. between January 1975 and July 1, 1979. The initial TSCA inventory was reported in 1979. TSCA also requires that EPA be notified ninety days prior to the manufacture or importation of new chemicals not reported on the inventory. Confidential information, such as trade secrets and financial data, is protected from disclosure by the Administrator. TSCA provides for establishment of an Interagency Testing Committee to make recommendations to the Administrator about hazards associated with chemical substances. The committee is required to prepare a list of priority chemicals which are known or are suspected of causing or contributing to cancer, gene mutations, or birth defects. The Administrator of EPA may prohibit or limit the manufacturing, processing, distribution in commerce, use, or disposal of a chemical substance if he finds that any

combination of these activities presents or will present an unreasonable risk of injury to health or the environment. TSCA does not require permits.

For purposes of administering TSCA, EPA may inspect any establishment, facility, or other premises in which chemical substances are manufactured, processed, or stored and any conveyance used to transport chemicals in commerce. Monitoring for compliance with regulations addressing PCB's and chlorofluorocarbons is specified in TSCA. TSCA also enables the Administrator of EPA to make grants to states for the establishment and operation of state programs to prevent or eliminate exposure to toxic substances. Currently, the Wisconsin Department of Health and Social Services is conducting an epidemiological study of health problems associated with exposure of mobile home residents to formaldehyde, and the Michigan Department of Natural Resources is developing an inventory of industrial facilities which discharge critical materials. New York is investigating screening procedures to test environmental samples and is carrying out other activities on a pilot-program basis to develop a comprehensive state-wide toxic substances control strategy.

TSCA provides EPA the authority to conduct both short-term research on specific chemicals and long-term research for new methods to evaluate and control chemical hazards. Currently, EPA research is focused on screening methods for health effects testing and validation of ecological effects testing methods to predict fate and transport of chemicals in the environment.

ASSESSMENT

EPA under TSCA is developing testing guidelines for the risk assessment of new chemicals or new chemical uses. TSCA allows EPA to withhold the manufacture of a chemical until adequate testing has assured that no unreasonable risk to the environment or human health will result from the manufacture, distribution, and use of a particular chemical. EPA is developing standards for testing of chemicals to determine whether they could produce oncogenic or other chronic effects as well as ecological effects. TSCA also authorizes EPA to establish rules under which chemical manufacturers and processors can be required to maintain and report information on the identity, structure, uses, and production of chemicals; worker exposures; human health; environmental effects; and other factors.

EPA has developed State-EPA Agreements (SEA's) whereby EPA will submit information on chemical production to each of the states. This information will be listed by zip code, chemicals produced, and production volume. The information can then be used to map the locations of various facilities which have the potential of being major sources of toxic pollutants. Environmental monitoring programs will then be established to determine the extent of environmental contamination that is actually occurring. Emission inventory and/or discharge information will be compared to information on the extent of population exposure to estimate the risk to the general population and identify toxic substance problems.

CONTROL

Under TSCA, the Administrator of EPA may initiate a wide range of actions to regulate chemical substances and minimize their risks. Such actions include prohibiting, limiting, or constraining the manufacture, processing,

distribution, or use of a particular substance; requiring labels, warnings, or instructions in the use of a chemical substance; or requiring replacement of substances on notice of unreasonable risk. TSCA regulates existing chemicals not covered by other federal acts, and specifically provides for coordination of the regulatory programs of the various additional acts which are to be used first.

TSCA provides enforcement authority of both civil and criminal penalties for non-compliance. Civil penalties may not exceed $25,000 per day for each day of non-compliance; criminal penalties may not exceed $25,000 for each day of violation, or imprisonment for not more than one year, or both.

A Toxic Substances Coordinating Committee was established by EPA Region V to deal with reported incidents of chemical contamination which would not be handled by the emergency spill response system or by the Uncontrolled Hazardous Waste Site Task Force. The objectives of this committee include responding to incidents of toxic chemical contamination and reported adverse health effects; developing a long-term procedure ensuring that all appropriate regional offices know about and appropriately participate in the evaluation and correction of problems associated with toxic chemical exposure; and developing a mechanism to anticipate, identify, and rank toxicant problems in Region V.

The control activities undertaken by EPA are not restricted to any one law such as TSCA. Due to TSCA's provision that other applicable laws be used first if possible, EPA evaluates the specifics of each case and uses the most appropriate authority.

STATE LEGISLATION AND PROGRAMS

TSCA has no real delegatable programs which can be given to the states. The states all have programs which carry out various TSCA-like activities. Limited federal funding is available, however, for states initiating activities which coincide with the objectives of TSCA.

ILLINOIS

Chemical substances are regulated under the general authority of the Illinois Environmental Protection Act. Activities include compliance monitoring, response to environmental chemical contamination events, and monitoring of chemical contaminants in air, water, and fish within the state.

INDIANA

Indiana is establishing an Office of Chemical Risks which would disseminate information on one hundred specific chemicals used in and/or transported through the state.

MICHIGAN

Regulation of toxic substances is authorized under the Michigan Water Resources Act 245 (Public Law 1929, as amended), the Michigan Air Pollution Control Act (Public Law 1965), and the Michigan Solid Waste Disposal Act 641. Michigan Senate Bill 700 is a proposed bill which would require all users and

manufacturers of critical materials to report to the state. The Critical Materials Register is an inventory of priority chemicals produced in Michigan.

MINNESOTA

Minnesota has an ambient monitoring program to determine the level of toxic substances in fish and sediments; a 96-hour flow-through biomonitoring program using fish is also used to detect the presence of toxic substances in water. Inspection, monitoring, and emergency response relating to chemical substances are authorized under Minnesota Statutes 115 and 116. For PCB's the statute sections are 116.36 and 116.37, and the regulation is 6MCAR §4.8038.

NEW YORK

Regulation of toxic chemicals is carried out through comprehensive water, air, and solid waste programs. An industrial chemical survey initiated in 1976 is being updated and expanded and is being used, primarily in water-related programs, to define priority chemicals for monitoring and to identify chemicals that need regulation. New York has a comprehensive fish-flesh monitoring program for its major waterbodies that is in its fourth year of operation.

OHIO

Ohio is developing a program to provide improved coordination between the state and EPA. The state has been working with EPA on PCB investigations and asbestos inspections. Inspections, monitoring, and emergency responses to hazardous and toxic materials are authorized under the Ohio Revised Code.

PENNSYLVANIA

Authority for addressing hazardous and toxic problems is provided in the Clean Streams Law, the Hazardous Waste Law, and the Clear Air Law. The Pollution Incident Prevention Program requires industry to develop procedures for preventing hazardous toxic spills and for taking corrective action for spills that occur. The position of Epidemiological/Toxicological Coordinator was created for toxic problems encountered by the Department of Environmental Resources and by other state agencies.

WISCONSIN

Section 144.76 of the Wisconsin Statutes applies to hazardous substances spills. This section addresses notice of discharge, responsibility, prevention of discharge, contingency plan, Hazardous Substances Spill Fund, removal-emergency action, access to properties, exemptions, and enforcement exclusions.

OTHER U.S. FEDERAL LAWS

NATIONAL ENVIRONMENTAL POLICY ACT

Special mention should be made of the law underlying all federal environmental legislation, the National Environmental Policy Act (NEPA). NEPA created the Presidential level Council on Environmental Quality and

established the fundamental policy that environmental considerations, in the broadest sense of the term, will be incorporated into all federal decision-making. NEPA does this by requiring each federal agency to prepare an environmental impact statement in advance of each major action, recommendation, or report on legislation that may significantly affect the quality of the human environment. These environmental impact statements have become institutionalized as a major means to assure that the long- and short-term environmental impacts are evaluated prior to taking any action which could later cause environmental problems.

MARINE PROTECTION RESEARCH AND SANCTUARIES ACT

EPA administers the Marine Protection Research and Sanctuaries Act, which seeks to protect ocean resources from the effects of waste disposal at sea. Many of the regulations under this Act will not take effect until 1981. At that time, most ocean dumping will be banned. The Act affects the Great Lakes in that it provides for declaration of the lakes as marine sanctuaries and can extend special protection to them on that basis. Also, the regulations affecting the oceans can be applied to the Great Lakes.

FEDERAL HAZARDOUS SUBSTANCES ACT

The Federal Hazardous Substances Act is one of four acts administered by the Consumer Product Safety Commission (CPSC). This law covers "toxic" household products and chemicals, such as cleansers, anti-freeze, and polishes. Features under the Act include definitions of hazardous substances and requirements for packaging and labelling of various materials. Testing for degree and type of hazard is mandated. The primary means of implementation is bans and seizures of products and material types.

CONSUMER PRODUCT SAFETY ACT

The CPSC also administers the Consumer Product Safety Act which has several overlapping features with the Federal Hazardous Substances Act. The primary difference is the former covers more than the latter and can set standards for products as to performance, contents, and packaging. Food and drugs are also covered, as are lead paints for consumers. The primary means of implementation include standards, bans, and recalls of hazardous products.

LEAD BASED PAINT POISON PREVENTION ACT

The Lead Based Paint Poison Prevention Act is a special provision which complements the Consumer Product Safety Act. While not used extensively, the former primarily deals with limitations on the use of lead-based paints in federally assisted housing. Like the Consumer Product Safety Act, it is administered by CPSC.

POISONING PREVENTION PACKAGING ACT

The Poisoning Prevention Packaging Act, administered by the CPSC, is a complement to several other laws, including the Food, Drug and Cosmetic Act, the Federal Hazardous Substances Act, and the Consumer Product Safety Act. It deals primarily with packaging of toxic chemicals and products in such a way as to prevent the poisoning of children.

FOOD, DRUG AND COSMETIC ACT

The Food, Drug and Cosmetic Act is the basic coverage of food, cosmetics, medical devices, and drugs. Administered by Food and Drug Administration, it sets standards for various substances and devices, requires proper labelling, and prohibits certain actions. Its primary relation to toxic or hazardous chemicals is to limit their introduction into food, cosmetics, and drugs or the basic stocks which make up those items. The Act's means of control is through bans and performance standards.

WHOLESOME MEAT ACT AND WHOLESOME POULTRY PRODUCTS ACT

Wholesome Meat Act and the Wholesome Poultry Products Act are closely related to the Food, Drug and Cosmetic Act, although they are administered by the U.S. Dept. of Agriculture instead of the Food and Drug Administration. While the Food, Drug and Cosmetic Act controls food and livestock food additives, these other two Acts are somewhat more specific, although basic coverage is similar. Additionally, these two Acts set standards for pesticide residues in meat and poultry.

OCCUPATIONAL SAFETY AND HEALTH ACT

The Occupational Safety and Health Act (OSHA) has set up a new bureaucracy which has been largely delegated to the states. OSHA is a wide-ranging law which covers almost every aspect of the workplace. Its coverage of toxic or hazardous substances extends to limiting worker exposure and/or requiring protective clothing and devices. Standards for worker exposure to such substances are regulated under OSHA.

HAZARDOUS MATERIALS TRANSPORTATION ACT

The Hazardous Materials Transportation Act is the umbrella law for movement of all hazardous substances. Regulations developed by the U.S. Dept. of Transportation (DOT) deal with container engineering and requirements for various materials; storage, handling, and packaging procedures; as well as mandates as to what types of substances can or cannot be shipped by various modes of transportation. Additional requirements cover shipping document labelling and placarding. This Act protects the Great Lakes by attempting to prevent spills and unauthorized discharges.

FEDERAL RAILROAD SAFETY ACT

The Federal Railroad Safety Act is administered by DOT. As the name implies, it deals with safe transport of toxic and hazardous materials by rail. Regulations under this Act cover railcar safety and design standards, switching procedures in yards for various dangerous substances, and placarding of cargo for ready identification. This Act also attempts to prevent spills and unauthorized discharges which could damage the lakes.

DANGEROUS CARGO ACT

The Dangerous Cargo Act is one of the prime means by which the shipment of toxic and hazardous materials by water is controlled. It is administered by DOT's marine arm, the U.S. Coast Guard. Basically, the Act regulates what

types of cargoes can be carried by what means, what kind of records must accompany such cargoes, how they must be packaged, labelled, and stored. The basic intent of the Act is to control spills and prevent fires or dangerous chemical reactions at sea.

PORTS AND WATERWAYS SAFETY ACT

The Ports and Waterways Safety Act is another statute which attempts to prevent spills of hazardous materials on the water. It too is administered by the Coast Guard. It complements the Dangerous Cargo Act by setting rules on the handling of hazardous materials in port and the movement of vessels loaded with certain types of cargoes into ports.

ATOMIC ENERGY ACT OF 1954

The Atomic Energy Act of 1954 is administered primarily by the Nuclear Regulatory Commission. The Act sets environmental standards for exposure levels to radioactive materials. Basically, it covers almost all phases of possession, production, and use of nuclear materials and associated facilities.

URANIUM MILL TAILINGS RADIATION CONTROL ACT OF 1978

The Uranium Mill Tailings Radiation Control Act of 1978 is jointly administered by several agencies including EPA, the Nuclear Regulatory Commission, and the Department of the Interior. It seeks to control the discharge of radioactive mine tailings. Regulations cover standards for discharge facilities and exposure as well as permissible activities in mine waste disposal.

5 TOXIC SUBSTANCES LEGISLATION IN CANADA

ENVIRONMENTAL CONTAMINANTS ACT

The Environmental Contaminants Act is officially known as an act to protect human health and the environment from chemical substances. Human health aspects are dealt with by the Department of National Health and Welfare and ecological and other matters by the Department of the Environment (DOE). The responsibility for the administration of the Act belongs to the Environmental Protection Service of DOE.

The Act provides the government with the power to obtain a systematic overview of the problem of contamination of the environment by a substance, regardless of source, use, product, or media, and to apply the appropriate controls, if necessary, in those cases where other legislative authority does not exist or is not used.

While the Act does not control any uses of the lakes, it does control toxics to prevent their entry into the lakes. It also allows for the evaluation of the lakes in order to assess the need and/or effectiveness of controls.

INFORMATION BASE

The Environmental Contaminants Act gives the power to undertake systematic investigations of substances or classes of substances in order to determine their fate in commerce and in the environment.

As a first step, Section 3(1) allows the collection of data pertaining to the quantities of a substance. This is accomplished by publishing a notice in the "Canada Gazette", under the authority of Section 3(2) of the Act, requiring any person who has in the previous twelve months imported, manufactured, or processed or who intends in the twelve months following publication to import, manufacture, or process a substance specified in the notice, to provide the data to the government.

If it is suspected that a substance is entering or is likely to enter the environment so that a danger exists or may exist to the environment or to human health, then data can be collected in accordance with Section 3(3) regarding:

1. The nature of the substance
2. Its presence in the environment
3. Its dispersion in the environment

4. The effect of that substance on the environment and on human health, including accumulation in biological tissues

5. The methods of controlling and testing the effects of the presence of that substance in the environment.

Should there be reason to believe that a substance is entering or is likely to enter the environment so that a significant danger to the environment or human health exists or will exist, the government can, as per Section 4(1)(a), by publishing a notice in the "Canada Gazette", require any person engaged in any commercial, manufacturing, or processing activity involving the substance to inform of the fact of that involvement. As well, under Section 4(1)(b), a notice can be sent to any person engaged in any commercial, manufacturing, or processing activity involving the substance in issue requiring that person to submit information specified in the notice.

Section 4(1)(c) provides a potent data collection mechanism since any person engaged in the importation or manufacturing of a substance can be required to carry out specified tests.

Section 4(6) imposes an automatic reporting requirement on every person who in a calendar year manufactures or imports for the first time greater than 500 kilograms of a chemical compound. A person so affected must notify the government of the name of the compound, the quantity involved, and any information in that person's possession respecting any danger to human health or the environment. This information must be passed to the government within three months of reaching the 500 kilogram amount. This provides an effective screening device since DOE should be aware of the trends in chemical use before any resulting environmental problems get out of hand. Early preventative action could then be taken to ensure that the environment and human health are protected.

A List of Priority Chemicals has been developed under the Environmental Contaminants Act. The list, comprising primarily chemical substances that are imported into Canada or manufactured or processed in Canada, does not incorporate a ranking system but divides the chemicals into four categories. These categories reflect the status of the chemicals with respect to development of regulations or further investigations needed. Three sets of criteria are used to select chemicals for the list:

1. Toxic effects. Evaluation of scientific data leads to the conclusion that the chemical substance causes or could cause adverse effects on humnan health or the environment

2. Persistence. Evaluation of scientific data leads to the conclusion that the chemical substance could accumulate or is accumulating to significant concentrations in air, water, soil, sediment, or biota

3. Quantity and use. Evaluation of available data on the importation, manufacture, or processing of a chemical substance leads to the conclusion that the substance could enter or has entered the environment in significant quantities.

The lists are revised on a yearly basis to take into account new concerns or to remove substances which are no longer of concern.

In order to enforce the Act, inspectors are designated and assigned specific responsibilities. An inspector is not given *carte blanche* power to enter any place at any time to carry out an inspection. The first restriction is that the inspection should be conducted at a reasonable time.

In addition, the inspector must have a reason or justification for believing that a contravention of the Act has occurred and that it is necessary to enter the place to conduct enforcement activities. Therefore, fishing expeditions are not permitted. The wording of this section is broad enough to allow a search for all contraventions of the Act including the failure of a person to supply information pursuant to a notice in the "Canada Gazette".

Once the inspector has gained entry, he can examine any substance or product which he finds. This broad power is qualified, however, if the product or substance is in a package or container which must be opened in order for the substance to be examined. In this case, the inspector must have justification for believing that the package contains a scheduled substance. Documents and other records can be searched if there is any reason to believe that any provision of the Act has been contravened, not just Section 8 offences. With respect to documents, the inspector is allowed to make copies or to take photographs of the documents, but not to take the originals. Finally, it should be noted that any evidence obtained by the inspector, whether or not relating to the reasons for the search, would be admissible providing the other rules of evidence were observed. As an example, if the inspector carried out a search directed at PCB's and found Mirex, then the evidence would be admissible to prove an offence of the Mirex Regulations if the evidence would be otherwise admissible, for example, if the continuity of evidence is maintained.

Sub-section 10(2) is important for it allows the inspector to require either the person in charge, the owner, or any other person in the place to provide the inspector with whatever information he may reasonably require. Sub-section 11(2) provides the inspector with the authority to take samples. Thus, if the inspector required a sample from equipment such as a vapor diffusion pump regarding the PCB Regulations, he could demand information showing when the pumps came into operation and a sample to determine if PCB's were being used.

It is an offence under the Act for any person to hinder or obstruct an inspector when carrying out his duties and functions. This is a valuable tool to the inspector should he be denied access to a plant or otherwise hindered in collecting information or samples, for the mere mention that an offence is being committed is usually sufficient to obtain reluctant cooperation. However, no offence is committed by obstructing or hindering an inspector not working within his power, as would be the case if the inspector attempted to carry out an inspection at an unreasonable time or without justification for believing that an offence had occurred.

The seizure and detention powers can be exercised by an inspector if he has justification for believing that an offence has been committed in relation to the substance or product in question.

Unless in the public interest, the inspector cannot seize and detain more of the substance or product than required for evidence and analysis. If a danger to the environment or human health would be created without a seizure of the complete amount of the substance or product, the inspector would not be limited. Two factors would probably have to be present to justify the seizure of the total amount of substance or product. Firstly, the inspector would have to have reason to believe that the owner or person in charge of the product or substance would sell or release or otherwise get rid of the material. Secondly, the release or sale would constitute a violation of the Act and thereby create danger to human health or to the environment.

Section 4 of the Act provides for confidentiality of information gathered under the Act. Any information, whether submitted in compliance with a specific section of the Act or voluntarily to aid in any preliminary assessment, which is considered by the reporting person to be confidential may be claimed as such in writing. The information will not be disclosed except as may be necessary for the purposes of the Act.

ASSESSMENT

Under Section 4, industry may be required to submit data on imports and production as well as details of processes, impurities, and losses to the environment. Furthermore, industries may be required to carry out tests respecting the physical, chemical, and biological properties of selected substances to improve the understanding of what threats they may pose. An integral part of the investigation will be an assessment of the potential impact of a substance leading to a risk decision by the government as to, first, the likelihood of the entry of that substance into the environment and, second, whether it constitutes a significant danger to human health or the environment. Assessments include such aspects as substance synthesis, uses, imports, exports, disposal methods, alternative compounds, ecosystem contamination, and environmental implications and recommendations for research, investigations, and controls.

Many of these assessments are carried out by inter- and intra-agency task groups, each agency being responsible for assembling specific data for the group. Any gaps in information required to carry out the assessment are filled by the most appropriate agency. In most cases this involves cooperation with provincial government environmental agencies.

CONTROL

Sections 8 and 18 of the Environmental Contaminants Act contain comprehensive powers to restrict or prohibit the release of a named substance into the environment, the use of that substance for certain purposes, or its incorporation into a manufactured product. Controls under the Act will be effected by adding a substance or class of substances to a schedule to the Act and by prescribing regulations to prevent the entry of the substance into the

environment in quantities, concentrations, or under conditions deemed unacceptable.

If the government is satisfied after collecting the information on a substance that a significant danger to the environment or to human health exists or will exist, and that action should be taken, they will offer to consult with the provincial governments and any federal departments or agencies in order to determine whether the significant danger will be eliminated by any action taken or proposed to be taken pursuant to any other law. If this offer to consult is not accepted within thirty days, it may reasonably be assumed that there is tacit approval of the proposed control measures, and the proposed order and regulations will then be published in Part I of the "Canada Gazette". This action normally will be to add the substance in question to the schedule to the Act and to produce regulations pertaining to that substance. The appearance of the substance on the schedule will alert persons to the fact that the substance is prescribed or dealt with by the Act. The regulations would indicate the conditions or limits by which the substance can be imported, manufactured, processed, used, or released as the case may be. Should the government desire a modification of an existing regulation, the "Canada Gazette" notice would simply contain the proposed change. These proposals are published to provide an opportunity for those interested in the action to object. The time limit for registering an objection is sixty days.

Although the Act gives the power to regulate the importation, manufacture, or processing of any chemical substance that poses a threat to human health or the environment, chemicals that are used solely as drugs, food additives, or pesticides are arbitrarily excluded from consideration because they are already carefully scrutinized and controlled under other specific federal legislation. Substances which have been banned from use or manufacture under the Act are polychlorinated terphenyls, polybrominated biphenyls, and Mirex. Regulations are also in effect to limit certain uses of PCB's and chlorofluorocarbons.

CLEAN AIR ACT

The Clean Air Act, officially proclaimed in 1971, provides the basis for the federal government's air pollution control activities. The three major objectives of the Act are to:

1. Protect the health of the public from air pollution

2. Promote a uniform approach across Canada in the control of pollutants

3. Make provision for the mechanisms and institutions needed to ensure that all measures to control air pollution can be taken.

The Act gives the government authority to coordinate a national program of air pollution surveillance in Canada, to establish national air quality objectives or targets for air quality, to establish regulations that will include emission standards applying at the source of air pollution, and to establish guidelines which contain recommended emission limits.

The Act is administered by the Environmental Protection Service of DOE.

INFORMATION BASE

Section 3 of the Clean Air Act makes provision for the collection and publication of data on air pollution. This includes a responsibility for maintaining a continuing record of ambient air pollution levels in urban areas on a national basis, for defining problems through field investigations, and for providing consultative services to federal or provincial agencies on air pollution surveillance.

A prerequisite to an effective air pollution control program is an accurate definition of the pollution problem. Such a definition can be made only through the compilation of inventories of the sources and emissions of contaminants and through a determination of the concentration of contaminants in the atmosphere. The latter is accomplished through the National Air Pollution Surveillance (NAPS) network and through ambient air quality studies, and the former through compilation of national inventories of air contaminant emissions. Inventories are complied for the five most common air contaminants and for those that are potentially hazardous.

The potentially hazardous air contaminants dealt with in these inventories may present a significant danger to human health and/or to the environment. These inventories are used to define air pollution problems and to assist federal and provincial control agencies in developing programs and establishing control priorities. To date, twelve such inventories have been published for the sources and emissions of nickel, cobalt, antimony, tin, bismuth, chromium, copper, barium, benzene, phosphorus, chlorine, and hydrogen sulphide.

One of the first actions taken after passage of the Clean Air Act was the compilation of a nationwide inventory of air contaminant emissions for Canada. The first inventory provided an overview for 1970 of air pollution problems with respect to the five contaminants that are the most significant in quantity: sulphur oxides, particulate matter, carbon monoxide, hydrocarbons, and nitrogen oxides. The inventory was subsequently revised and updated to provide similar overviews of nationwide emissions for 1972 and 1974. A further revision based on 1976 data is in progress.

The inventory is being updated biennially to provide a mechanism to evaluate the effectiveness of air pollution control programs in Canada. In addition, it provides vital information for the development of air pollution control strategies.

All inventory information about the five common air contaminants is now stored in the National Emissions Inventory File Management System that provides easy access to the retrieval of data and has rapid updating capabilities. The inventory information developed for the potentially hazardous air contaminants will be added to the system in due course. In cases where the government believes a release of an air contaminant is taking place, the offending operation may be required, under Section 6 of the Act, to submit on a regular monthly, quarterly, or annual basis such information

relating to the operation as may be required. This could include sampling results and process data.

To ensure sound planning of activities within the air pollution control program, it is important to have a continuously updated knowledge of the nature and extent of air pollution across Canada. The NAPS activity regularly collects data on ambient air concentrations of the most common contaminants on a continuing basis. Short-term surveys are used to provide information in response to special requirements. The NAPS network consists of air monitoring instruments located in major population centres across Canada. The network is a cooperative effort of the provincial and municipal governments. The accumulation of network data has permitted the detection of trends in the levels of pollution with changing industrial activity, population density, and air pollution abatement progress. Information collected by the network can be used in epidemiological studies and in the development of air quality objectives.

During 1978-79, the NAPS network was expanded and improved. On March 31, 1979 the network consisted of 562 air monitoring instruments at 159 sampling stations in all major urban areas of the ten provinces and the two territories. This extensive coverage includes 43 stations that have continuous monitoring equipment for the five most common air contaminants (sulphur dioxide, suspended particulate matter, carbon monoxide, nitrogen oxides, and ozone) and five other stations in which four contaminant concentrations are monitored continuously. Of the 562 instruments in the network, 232 are continuous monitors: 88 for sulphur dioxide, 51 for carbon monoxide, 48 for nitrogen dioxide, and 45 for ozone. Suspended particulate matter is monitored by 111 high-volume samplers, each of which operates for an unbroken 24-hour period every sixth day.

The majority of NAPS stations are now operated by provincial or municipal personnel. The data collected by NAPS network operators are compiled by the Environmental Protection Service and published as monthly and annual summaries.

One of the objectives of the Act is to conduct research to develop a clear understanding of the nature of the important atmospheric processes of transport, distribution, and transformation of pollutants to provide an improved assessment of their impact on the environment. Studies are done or are supported to specify pollution sources, the processes of dispersion and transport by air currents, pollutant concentrations, chemical modification in the ambient air, and deposition on the earth's surface. Work on pollution sources is generally of a review nature and is done in conjunction with regional assessments. Experimental studies are carried out using sophisticated equipment and data analysis procedures that describe atmospheric processes and effects on the biosphere. These are used in combination with theoretical research to develop forecasting models and in the development of departmental air management strategies.

Over the past year activities have been organized to produce a provisional statement of sulphur quantities being added to the atmosphere and subsequently transported over great distances to be deposited within a three million square kilometre area in eastern Canada. Use has been made of the 50-station

Canadian Network for Sampling Precipitation for verifying theoretical pollutant transport, concentration, and deposition estimates.

ASSESSMENT

National air quality objectives are designed to protect public health and the environment by setting limits on the concentrations of contaminants in the ambient air. The Clean Air Act makes provision for three levels of air quality objectives for major air contaminants: desirable, acceptable, and tolerable.

The maximum desirable level defines the ultimate goal for air quality and provides a basis for an anti-degradation policy for the unpolluted parts of the country and for the continuing development of control technology.

The maximum acceptable level is intended to provide adequate protection against adverse effects on soil, water, vegetation, materials, animals, visibility, personal comfort, and well-being.

The maximum tolerable level denotes a concentration of an air contaminant that requires abatement without delay to avoid further deterioration to an air quality that endangers the prevailing lifestyle or, ultimately, to an air quality that poses a substantial risk to public health.

National air quality objectives are developed by expert subcommittees of the Federal-Provincial Committee on Air Pollution. Those published to date include sulphur dioxide, suspended particulates, carbon monoxide, ozone, nitrogen dioxide, hydrogen fluoride, and hydrogen sulphide.

Additional assessments for specific sources of air pollutants are based on the extent of exposure to the general public and on an analysis of production, uses, properties of the pollutant, and the technology available for limiting release of the substance.

the long-range transport of air pollution is recognized as the most important environmental issue facing eastern North America. Consequently DOE has assigned highest priority to a research program that has two major objectives. The first is to assess the current state of the environment in eastern Canada, before the impact of emissions from increased coal burning in North America is felt. The second is to develop a clear understanding of the occurrence and effects of long-range transport of air pollution within and into Canada, including geographical extent, severity, and socio-economic costs. The departmental program has four major components: sources and emissions; atmospheric transport, transformation, and deposition; aquatic effects; and terrestrial effects.

The major objective of the sources and emissions component was to identify and quantify the sources, both man-made and natural, and the emissions of sulphur compounds in Canada in order that the atmospheric transport, transformation, and deposition aspects of the problem can be adequately studied. The objective has been met and a comprehensive inventory of sulphur dioxide sources and emissions has been completed. Similar studies are now

being undertaken for nitrogen oxides and hydrocarbons, important precursors in the formation of ozone.

CONTROL

Section 7 of the Clean Air Act empowers the Governor in Council to prescribe national emission standards for air contaminants which constitute a significant danger to human health. The Environmental Protection Service consults with the Department of National Health and Welfare to obtain advice on the potential health hazards of such contaminants. In response to advice that it would be prudent to control atmospheric emissions of vinyl chloride and arsenic to minimize the danger to public health, development of regulations for these contaminants began in 1976.

In 1977, proposed regulations to regulate vinyl chloride emissions were announced in the "Canada Gazette". The amended regulations incorporating comments received in response to the proposal were published in the "Canada Gazette" on August 26, 1978. Additional comments were received but did not result in further changes to the final regulations that were published in Part II of the "Canada Gazette" in 1979. The regulations, entitled "Regulations Prescribing National Emission Standards for Vinyl Chloride Emitted by Vinyl Chloride and Polyvinyl Chloride Plants", became effective on July 1, 1979. The regional offices of the Environmental Protection Service are now developing implementation agreements with the provincial governments.

A recommended code of operating practice was published in the "Canada Gazette" on August 26, 1978. It is expected that adherence to the regulations and the code will reduce vinyl chloride emissions by approximately 95%. The standard reference method for the measurement of vinyl chloride emissions from the regulated sources was completed and published in July 1979.

The major sources of emissions of arsenic into the atmosphere have been identified as the gold roasting industry, the iron ore processing industry, and the non-ferrous primary metallurgical industry.

Draft regulations concerning the emission of arsenic from the gold roasting industry have been completed. Work is also continuing on the development of national emission standards regulations for asbestos manufacturing operations and for the non-ferrous smelting industry to control emissions of lead, mercury, and arsenic.

Sections 22 through 26 of the Act provide for the regulation of fuel composition and fuel additives and for the necessary administrative procedures to reduce emissions of air pollutants when fuels are burned. To develop appropriate limits for Section 22 of the Act, regulations have been developed to obtain the required information on the current composition of petroleum fuels, including sulphur content, and on their additives and the impurities in crude oils. The Fuels Information Regulations, No. 1, were published in Part II of the "Canada Gazette" on August 10, 1977. An amendment to clarify the regulations was published in the "Canada Gazette" in March 1979. The amendment does not affect the intent of the regulations, and information is required for 1978.

Under Section 8 of the Act, provision is made for the federal government to publish national emission guidelines indicating the quantities and concentrations in which any air contaminant should not be emitted into the ambient air from sources of any class, whether stationary or otherwise. Each guideline consists of a document specifying emission limits for new sources and an industry study report in which available emission control strategies for existing sources are assessed. The technical review and assessment of control strategies is done by advisory committees consisting of federal and provincial government representatives and advisors from industry. The limits specified in the guidelines can become enforceable if they are prescribed by other regulatory agencies as standards or requirements. Guidelines have been published for the cement industry, the asphalt paving industry, the coke oven industry, arctic mining operations, packaged incinerators, and the wood pulping industry.

There are no direct provisions in the Act for the regulation of air pollution emissions from mobile sources. The Act does, however, address itself to mobile as well as stationary sources under its general provisions for air quality objectives, air quality monitoring and surveillance, vehicle emissions, fuel composition regulations, and federal-provincial cooperative programs.

Although the control of emissions from in-use motor vehicles is outside federal jurisdiction, the very high concentrations of air pollutants emitted by badly maintained vehicles are of great concern. A program to review and evaluate compulsory inspection systems used in Canada, the U.S., and several European countries is continuing with a view to developing, with the cooperation of industry and the provinces, a federal guideline for the implementation of such inspection programs.

National Emission Standards Regulations for Secondary Lead Smelters were adopted by the Governor in Council and promulgated in Part II of the "Canada Gazette" on July 28, 1976. The regulations became effective on August 1, 1976.

National Emission Standards Regulations for Mercury Cell Chlor-Alkali Plants were promulgated in Part II of the "Canada Gazette" on July 27, 1977 and became effective on July 1, 1978.

National Emission Standards Regulations for Asbestos Mines and Mills were promulgated in Part II of the "Canada Gazette" on July 13, 1977 and took effect on December 31, 1978.

Penalties provided under this Act include a $200,000 fine for each offence for violation of a regulation and a $5,000 fine for:

1. The unlawful production or importation of a fuel with any additive that exceeds specified standards

2. Failure to comply with the order of an inspector

3. Failure to provide information requested by the Minister.

Under the provisions of the Canada-Ontario Accord for the Protection and Enhancement of Environmental Quality, implementation of federal regulations is delegated to the province, wherein Ontario agrees to implement requirements at least as stringent as federal ones. Should the province be unwilling or unable to do so, the federal government would act in default.

FISHERIES ACT

The Fisheries Act is a Canadian federal piece of legislation designed primarily to protect the fisheries resources in Canadian waters. The general provisions of this legislation (Sections 33 and 34) enable the federal government to control and prevent pollution by setting standards to restrict the discharge of substances into any waters that may be "deleterious" to fish or to man's use of fish.

INFORMATION BASE

Under Section 33(12) the Minister may make regulations prescribing substances or classes of substances; quantities or concentrations of substances and classes of substances in water; and treatments, processes, and changes of water as being "deleterious substances" and therefore limit their deposit into waters frequented by fish.

Section 33.2(3) gives authority for an inspector to enter a premises at any reasonable time to conduct inspections, examine any substance or product, take samples, or conduct test and measurements.

There are no specific provisions related to the establishment of an information base.

ASSESSMENT

Regulations and guidelines under Section 34(h) of the Act are developed on an industry sector basis. Priorities are established on the basis of gross loadings to receiving streams. A task force is struck for each industry sector consisting of representatives from federal and provincial governments and industry. Industry processes are examined in detail to identify commonality between processes, level of treatment, technology in place or required, and gross loadings. On this basis, best practicable technology (BPT) is determined (or research is conducted to determine BPT) and a regulation (for new, altered, or expanded operations) or guideline (for existing sources) is developed on this basis.

Under Section 33.1(1) anyone proposing a new work or undertaking that may result in the deposit of a deleterious substance may be required to submit plans and specifications or to take samples, conduct analyses, or complete studies and evaluations regarding the deposit of the substance and specify any mitigating measures that may be required.

CONTROL

Section 33(2) is the basic prohibition against pollution of waters frequented by fish. Section 33(4) provides that deleterious substances may be

deposited to the extent authorized by regulations under subsection 33(13). The definition of a deleterious substance is given in Section 33(11), and authority to name specific deleterious substances by regulation is provided in Section 33(12).

Site-specific pollution problems may be addressed under authority provided in Section 33.1(2), wherein the Minister may issue an order for corrective action to be taken. This is subject to a provision in Section 33.1(4) respecting consultation with provincial governments.

Section 33.2(4) allows for the development of mandatory spill reporting regulations consistent with provincial requirements.

Penalties under the Fisheries Act are $5,000 for a first offence and $10,000 for each subsequent offence for failure to provide information or to report as requested by the Minister, and $25,000 for a first offence and $50,000 for each subsequent offence for:

1. Carrying on any work or undertaking without the prior approval of the Minister

2. Failure to take reasonable measures to limit a discharge of a deleterious substance

3. Failure to comply with the requirements of an inspector

4. Obstruction or hindrance of an inspector or knowingly making a false statement.

An inspector may enter any premises at any reasonable time when he has reason to believe that an offence has been committed. He may conduct inspections, examine any product or substance, take samples, and conduct tests and measurements.

The following is a current list of regulations under Section 34(h) of the Fisheries Act:

1. Pulp and Paper Effluent Regulations and Guidelines, November 2, 1971

2. Chlor-Alkali Mercury Liquid Effluent Regulations, March 28, 1972, revised July 7, 1977

3. Petroleum Refinery Liquid Effluent Regulations and Guidelines, October 30, 1973

4. Fish Processing Plant Liquid Effluent Guidelines, 1975

5. Metal Mining Liquid Effluent Regulations and Guidelines, February 24, 1977

6. Meat and Poultry Products Plant Liquid Effluent Regulations and Guidelines, March 31, 1977

7. Potato Processing Plant Liquid Effluent Regulations and Guidelines, June 23, 1977

8. Metal Finishing Liquid Effluent Guidelines, 1977

Under the provisions of the Canada-Ontario Accord for the Protection and Enhancement of Environmental Quality, implementation of federal regulations is Ontario's responsibility. The federal government agrees to implement these requirements only where the province cannot or will not do so.

TRANSPORT OF DANGEROUS GOODS ACT

The Transport of Dangerous Goods Act was passed on July 17, 1980. The objective of the Act is to promote public safety in the transportation of dangerous goods. The Act has been proposed by the Minister of Transport and may be administered and enforced by a provincial government, upon entering into an agreement with the Minister of Transport.

Under the Act, the definition of "dangerous goods" includes hazardous wastes by any one of several criteria.

INFORMATION BASE

The Act is designed to regulate the daily movement of dangerous goods. The objective of the Act does not require accurate definition of pollution problems.

ASSESSMENT

The Act does not allow for objectives in terms of assessment of limits related to the environment.

CONTROL

The Act is expected to be proclaimed, along with a number of regulations, prior to the end of 1980. The regulations will prescribe shipping documents to accompany shipments of hazardous wastes and will include definitions and lists of hazardous wastes. Proposed regulations shall be published in the "Canada Gazette", with opportunity for interested parties to make representations.

The Act gives authority to regulate handling, offering for transport, and transporting of dangerous goods, by any means of transport, whether or not for hire anywhere in Canada.

Included in the Act is provision for regulations to be developed which will establish a hazardous waste manifest system to cover shipments moving interprovincially and internationally and to regulate facilities (e.g. warehouses) from where shipments are moved or into which they are received.

HAZARDOUS PRODUCTS ACT

The Hazardous Products Act is an enabling statute that permits the regulation or prohibition of the advertisement, sale, or importation of any

product or substance that may constitute a danger to the health or safety of the public due to its design, construction, or contents. It specifies a Schedule in two parts to which products or substances may be added or deleted. Products that are totally prohibited for advertisement, sale, or importation appear in Part I; products that are similarly prohibited, unless they conform to regulations, appear in Part II. The Act is administered by the Minister of Consumer and Corporate Affairs although there is a mechanism that permits the Minister of National Health and Welfare to act alone in recommending that a product be added to Part I of the Schedule.

INFORMATION BASE

The Act allows the inspection of any place that an inspector has reason to believe that a hazardous product is manufactured, prepared, preserved, packaged, sold, or stored for sale. He may examine any such products, take samples, examine any books, records, or other documents, or seize the product. Once the Minister has reason to believe that a product may be added to the Schedule, he may ask the manufacturer to disclose the formula, composition, or chemical ingredients of the product and any other information in the possession of the manufacturer.

ASSESSMENT

The objective of the assessments performed under the Act is to demonstrate an existing or potential hazard due to the design, construction, or contents of a product. Evaluations address four main concerns: product toxicity, flammability, explosiveness, and corrosiveness. These evaluations are based on existing scientific knowledge of the chemical ingredients in the product, the results of product testing (proactive), and accounts of observed hazards (reactive).

CONTROL

The Act covers a wide range of hazardous products that may include toxic substances. The main control mechanism is the placement of a product in the Schedule. The products appearing in Part I are banned while those appearing in Part II are regulated. The regulations (such as the Hazardous Substances Regulations) can prescribe labelling and disclosure requirements, product standards, performance standards, and specifications for the levels of toxic substances. Compliance with the Act is enforced through the inspection and analysis activities of the Department of Consumer and Corporate Affairs.

PEST CONTROL PRODUCTS ACT

The Pest Control Products Act is an enabling statute intended to regulate products, devices, organisms, or substances manufactured, represented, sold, or used to directly or indirectly control, prevent, destroy, mitigate, attract, or repel pests. Thus, substances used as pesticides would be subject to this legislation. The control exercised by this Act affects the entry of a specific class of substances into commerce and therefore into the general environment by requiring registration prior to marketing. The Minister of Agriculture is named as the sole authority in the Act.

The Act prohibits the manufacture, storage, display, distribution, or use of any pesticide under unsafe conditions. Packaging or labelling in a manner that is false, misleading, deceptive, or that could create a false impression concerning its character, value, quantity, composition, merit, or safety is prohibited. The Act also prohibits the importation or sale of pesticides in Canada that have not been registered, packaged, or labelled as prescribed or do not conform to prescribed standards. It is not permissible to export or convey a pesticide from one province to another unless it was manufactured in a registered establishment that complies with prescribed conditions. Section 5 of the Act confers authority to the Governor in Council to make regulations to prescribe, *inter alia*, the form, composition, and other standards for pesticides; standards for efficacy and safety; and conditions of manufacture, storage, distribution, display, use, packaging, labelling, and advertising.

INFORMATION BASE

The Act requires that every pesticide imported into or sold in Canada be registered for every use. In the application for registration the applicant must include the trade name; a description of the product; the name, content by percentage weight, and specifications of the active ingredients; and the name and address of the manufacturer of each ingredient. The Minister can request any information deemed necessary for registration as specified in the regulations, with the onus being on the applicant to generate and submit this information.

The Minister may request the results of scientific investigations that demonstrate the efficacy of the pesticide in Canada; the safety to persons occupationally exposed to the pesticide; the safety of the host plant, animal, or article; the effects on non-target organisms; the degree of persistence, retention, and movement of the pesticide and its residues; suitable methods of analysis for detecting the active ingredient in the formulation or the environment to which it is applied; methods to detoxify or neutralize the pesticide in soil, water, air, or on articles; suitable methods of disposal; and pesticide stability and compatibility.

The Minister can also require animal toxicity testing for purposes of toxicological evaluation, and tests to demonstrate degradation of the pesticide or its residues when it is applied to items intended for human consumption.

Once registered, the registrant must maintain records for five years concerning the quantities of the product stored, manufactured, or sold. These records must be made available upon request. The Act permits the inspection of any manufacturing establishment, the collection of samples as required, and the taking of copies of any books, shipping bills, bills of lading, documents containing instructions, or any other documents relevant to administering the Act.

ASSESSMENT

During the registration of a pesticide under the Act, the information that is submitted by the applicant undergoes a number of evaluations. This effort

concentrates on demonstrating the efficacy and the safety of the pesticide. A number of federal agencies participate as consultants in this exercise to provide the total assessment. The Department of National Health and Welfare and DOE review and comment on the safety of residues in food, the hazards of occupational and bystander exposure, pesticide disposal and environmental contamination, and the ecological impact on fish, wildlife, and forests. The Department of Agriculture assesses the merit and value of the pesticide, its agro-economic properties, ensures that labelling and packaging meet prescribed standards, and examines the analytical methodology.

The application for registration is rejected if the data do not satisfactorily demonstrate the safety, merit, and value of the pesticide for the intended use. The application will also be rejected if the data are incomplete. The applicant has the responsibility to generate and submit the additional information.

CONTROL

Under the Act the primary control over pesticides is the premarket registration; if a pesticide is not registered, it cannot be manufactured, stored, displayed, distributed, or used in Canada. In addition, the Minister has the right to suspend or cancel registration at any time in the light of new information. Every five years the pesticide must be re-registered for its intended use. Opportunity is also provided to re-evaluate the regulatory status at any time to cancel or to suspend registration, if necessary.

The right to inspect manufacturing establishments and seize a product believed to be violating any provisions of the Act provides a mechanism for enforcing this Act. The Department of Agriculture maintains an inspection and analysis program to assure compliance with regulatory standards. Enforcement is carried out in concert with the appropriate provincial authorities.

FOOD AND DRUGS ACT

The Food and Drugs Act is intended to ensure the nutritional quality of foods and to identify and control dangers associated with microbiological and chemical hazards in the food supply. The Minister of National Health and Welfare is named as the sole authority in the Act.

The Act prohibits the sale of food that has in or upon it any poisonous or harmful substances, has been adulterated, is unfit for human consumption, or was manufactured, prepared, preserved, packaged, or stored under unsanitary conditions. It allows the Governor in Council to make regulations declaring a food adulterated; respecting labelling, packaging, and advertising of foods to prevent deception of or harm to the consumer; to specify standards of composition, strength, purity, or quality of a food; to ensure conformity to the Act of imported foods; respecting the preparation, manufacture, and preservation of foods; to require persons to maintain necessary records; to specify the power and duties of inspectors; to exempt foods from the Act; to provide analysis of foods; and to add to or delete from the Schedules in order to protect human health.

INFORMATION BASE

The Act provides for the inspection of manufacturing, processing, or packaging establishments. The inspector may collect and/or detain samples and have them analyzed for purposes of administering the Act. The Act also specifies recordkeeping requirements for these establishments. Research is carried out by the Department to investigate existing and potential health hazards from substances in the food supply.

ASSESSMENT

Assessments are carried out by the Department to estimate both the nutritional value of foods and the exposure to poisonous or harmful substances and to identify potential hazards. These assessments in turn provide the basis for control actions and may stimulate research and/or monitoring projects.

CONTROL

The Act addresses all substances that enter into the human food supply. Foods that are manufactured, prepared, and packaged for sale in other countries are exempt from this Act if they are marked with the word "export" and are accompanied by a certificate indicating that they do not contravene laws of the importing country.

The regulations are the principal means of controlling toxic substances under this Act. These are developed from research carried out by the Department in concert with the assessments. The monitoring activities resulting from the inspection program ensure compliance to the Act.

6 TOXIC SUBSTANCES LEGISLATION IN ONTARIO

ENVIRONMENTAL PROTECTION ACT

The Environmental Protection Act is the most comprehensive act relative to the environment in Ontario. Its prime purpose is to provide for the protection and conservation of the natural environment.

The Act was first proclaimed in 1971. It has had several revisions and is presently undergoing a further change. The Act covers all phases of the environment - air, water, and waste - in relation to any contaminant.

The Act prohibits the deposit or discharge of any contaminant into the natural environment which may impair the quality of the natural environment for any use that can be made of it, cause injury or damage to property or to plant or animal life, cause harm or material discomfort, affect the health or impair the safety of any person and, finally, to render any property or plant or animal unfit for use by man.

The Act is administered by the Ontario Ministry of the Environment.

INFORMATION BASE

The Act gives the Minister the power to investigate pollution problems, conduct research related to contaminants (any solid, liquid, gas, odour, heat, sound, or vibration); establish monitoring programs to determine the quality of the natural environment; conduct studies into environmental planning and design; convene conferences and conduct seminars; gather, publish, and disseminate information relating to contaminants; and make grants and loans for research and training.

Section 83 of the Act permits a designated provincial officer to enter a site or plant at any reasonable time and make surveys, examinations, investigations, tests, and inquiries including examination of books, records, and documents and may make, take, or remove samples, copies, or extracts. The provincial officer is required to keep all information confidential except in respect of the deposit, addition, emission, or discharge of a contaminant into the natural environment or the administration of the Act, his council, or the consent of the person to whom the information relates.

Section 8 of the Act requires prior approval from the Ministry for any new processes that may emit or discharge a contaminant into the natural environment other than water. Thus, any new production of toxic substances would be examined to ensure that the permissible emission rate is met.

The Act provides for the issuance of regulations:

1. Classifying contaminants and sources of contaminants, and exempting any classes

by which it must be done. If there are reasonable and probable grounds that an immediate danger to human life, health, or property exists, the Director may issue a Stop Order.

The reporting of accidental discharges or any discharge out of the normal course of events is required, and the Act also contains a provision that any person may be ordered to do all things necessary to repair the injury or damage caused by such a discharge.

The programs and projects that are established are based on need. They may be chemically based, such as an overall control of fluorides or the control of lead emissions from secondary smelters. They may be industrially based, such as PAH's in the steel industry or sulphide emissions from the pulp and paper industry.

The control of PCB's in Ontario has led to several research programs sponsored by the Ministry aimed at destruction.

A seven-point program has been established for the control of liquid industrial wastes with a complete manifest system.

Programs and projects are evaluated as to their effectiveness by measurement where possible or accepted in the case of installations using best practical techology.

Enforcement is by issuance of Control Orders, violation notices, and court action.

Fines for noncompliance are $2,000 for violation of the waybill system. Violations of the Act may result in fines of $5,000 for the first day and $10,000 for each subsequent day. The statute of limitations is six months.

ONTARIO WATER RESOURCES ACT

The Ontario Water Resources Act was first passed in 1956 and substantially expanded in 1957 to regulate the use of Ontario's water resources on a province-wide basis. The original impetus for the Act was the need to control water supply and sewage treatment and disposal. The Act (originally Water Resources Commission Act) created the Ontario Water Resources Commission (now encompassed in the Ontario Ministry of the Environment) with substantial power to regulate water supply and sewage disposal and to control pollution. Sewage is defined to include drainage, stormwater, commercial wastes, industrial wastes, and other substances that may be specified in regulations.

INFORMATION BASE

The Act does not contain environmental standards for specific substances. It does provide the overall definition of what may constitute impairment or pollution of the aquatic environment. A document, "Water Management, Goals, Policies, Objectives and Implementation Procedures", published by the Ministry in November 1978, provides goals, policies and, where possible, specific objectives as to what constitutes acceptable water quality. In addition to outlining objectives for a number of toxic substances, the policy is to

require case-by-case examination of any proposal to release any hazardous substances for which provincial water quality objectives have not been established.

The Ministry is empowered to do research programs and supply information and technical advice on pollution control. This includes investigation of monitoring studies to determine if pollution is occurring, and Ministry staff are legally empowered to enter, inspect, and test any facility which may be discharging sewage.

The Ministry, through the delegation of the Minister, is charged with the supervision of all ground and surface water in Ontario and may examine both to determine if they are in any way polluted and what may be the cause of such pollution. Discharge or deposit of any material of any kind which impairs the quality of waters is an offence, and accidental discharges must be reported to the Minister.

All plans and specifications for effluent discharges must be submitted to the Ministry to obtain a permit prior to construction of the unit.

Projects are established to determine the effects of various discharges to watercourses. This may be a simple measurement of the chemicals present or a full-scale fish toxicity test.

The St. Clair River study is a good example of a major program. All effluents from the industries along the St. Clair River have been sampled and are being analyzed in respect to organic substances. At the same time, certain effluents are undergoing fish toxicity tests as well as tainting evaluations.

PCB's are being measured in fish in the Great Lakes to determine if any trend exists. To date it shows a decline.

Mercury, PCB's, Mirex, and pesticides are measured in fish in all the Great Lakes and data published as to their edibility.

ASSESSMENT

The data collected from the various projects are evaluated to determine what the priorities should be and what further data are required. Measurements of chemicals (toxics) are made in effluent streams and water bodies to determine if the required objectives are met.

The quality of water is determined to be impaired if it is considered that any material or derivative of material which is deposited or discharged may cause injury to any person, animal, bird, or other living thing as a result of the use or consumption of any plant, fish, or other living thing in the water or in the soil in contact with the water.

The uses of the goals and objectives as set down in the above-mentioned water mnanagement publication are based on the assimilative capacity of the receiving water body and are therefore variable.

CONTROL

Surveys are carried out by staff of the Ministry and, where deemed necessary, the Ministry may issue a Requirement and Directive to the person, ordering the control of such discharge within a limited time frame.

As well, any discharge or deposit, or permission of such, into, in, or near a well, lake, river, pond, spring, stream, reservoir, or other body of water or watercourse that, in the opinion of the Ministry may impair the quality of the water, can be halted by legal injunction.

Enforcement is made by the issuance of Requirements and Directives or court action. Fines are limited to $5,000 for the first day and $10,000 for each subsequent day. The statute of limitation is one year.

A large number of the control mechanisms for water are under the Environmental Protection Act.

PESTICIDES ACT

The Ontario Pesticides Act is the tool for control and enforcement within the province of the laws and regulations promulgated by the Canadian federal government. The purpose of the Act is to ensure the safe and sound management of pesticides in Ontario.

This Act controls the sale and use of all pesticides sold in Ontario. Pesticides are classified into six schedules on the basis of their toxicity, environmental or health hazard, persistence of active ingredient or its metabolites, concentration, and usage. Distribution, availability, storage, and use are closely regulated.

The Act was promulgated in 1967 and revised in 1973 with Regulation 618/74, passed in 1974.

INFORMATION BASE

Under the authority of the Act and its regulations, which are administered by the Pesticides Control Section of the Ministry of the Environment, all pesticide products sold in Ontario must be classified and assigned a schedule.

The pesticides classified are listed by their P.C.P. number or registration number in their assigned Schedule in a supplement to the Pesticides Act.

Pesticides are classified into six schedules on the basis of their toxicity, environmental or health hazard, persistence of the active ingredient or its metabolites, concentration, and usage. This classification system is aimed at controlling the distribution, availability, and use of pesticides in Ontario.

Through examination by qualified persons, the knowledge and competence of those wishing to apply pesticides is tested. For some classes of licenses, public liability and property damage insurance is a prerequisite.

Requests for aerial, aquatic, fumigation, and special-use permits are investigated by pesticide control specialists; technical advice and guidance may then be provided to the applicators.

Public information and education forms a large part of the program. Information is disseminated through fact sheets, information bulletins, fairs, and exhibitions. Seminars, courses, meetings, and clinics are also held to help those wishing to obtain a licence to apply pesticides.

The Act has many similarities to the Environmental Protection Act. It gives the powers to issue Control Orders, Stop Orders, spill legislation, and the formation of a Pesticides Appeal Board for review.

Similar to the Environmental Protection Act, the Pesticides Act prohibits the discharge of pesticides into the natural environment that may cause impairment.

The Act requires strict adherence to the storage and handling of pesticides by all persons concerned, and the maintenance of inventories for certain classes. Pesticide officers are empowered to enter and investigate pesticide handlers, similar to the Section 83 of the Environmental Protection Act.

ASSESSMENT

The pesticide officers regularly visit dealers in pesticides to ensure proper handling and storage as set out in the Act or regulation. Similarly, applicators are checked to see that they are following the Act or regulation.

Soil, vegetation, and water samples may be taken to determine any violations that may have occurred.

Samples of water from the Great Lakes have been analyzed for pesticides, especially Mirex and dioxin. The Ministry's Laboratory Services Branch has established a Dioxin Laboratory to determine levels of dioxin in water, fish, sediments, and air.

The pesticide program also involves mosquito and termite conrol throughout the province.

CONTROL

The same mechanism applies to the Pesticides Act as to any other contaminant and, thus, the control mechanisms used in the Environmental Protection Act are applicable, i.e. Control Orders, violation notices, and Stop Orders.

The major programs of licensing and permit issuing are designed to control the indiscriminate use of pesticides.

The fine structure for violations under the Act are up to $5,000 for the first day and $10,000 for each subsequent day.

ENVIRONMENTAL ASSESSMENT ACT

The Environmental Assessment Act provides for the assessment of any proposed major undertaking - governmental, municipal, or private - at the very earliest date to permit alteration or even cancellation of the undertaking should it be environmentally unacceptable. It also provides for full public participation in the decision-making process. It is being implemented in stages, applying first to provincial undertakings.

INFORMATION BASE

Under the Act, any proponent of an undertaking must submit to the Ministry of the Environment an environmental assessment on the proposal. All interested parties are given an opportunity to examine this document and may request that a public hearing be called by the Environmental Assessment Board established under the Act.

The assessment documents must indicate the proposed project and the effect it will have on all phases of the environment, including social-economic factors. It must outline alternative processes and sites and justify the proposed project.

Where no hearing is held by the Environmental Assessment Board, decisions are made by the Ministry or the Minister with the approval of the Ontario Cabinet. Where a public hearing is held, the Board makes the decision on whether an environmental assessment is accepted, or changed and accepted, and whether or not approval to proceed is withheld, given, or given subject to terms and conditions. There are no appeal rights as such but where the Board makes a decision, the Cabinet has the right on its own initiative to review the decision and reverse or modify it.

ASSESSMENT

The assessment under this Act is an evaluation by the Hearing Board and is separate from the Ministry of the Environment.

CONTROL

At the present time, all provincial projects are subject to the Act, as are a few private projects as deemed necessary by the Minister.

Maximum penalties for offences are, on first conviction, $5,000 and, on subsequent convictions, $10,000 per day, as under the Environmental Protection Act.

OTHER LEGISLATION

The following acts have some sections that are pertinent to the natural environment in Ontario:

1. Occupational Health and Safety Act

2. Public Health Act

3. Ontario Navigable Water Probation Act

4. Lakes and Rivers Improvement Act

5. Energy Act

6. Cancer Remedies Act

7. Consumer Protection Act

8. Gasoline Handling Act

9. Health Disciplines Act

10. Livestock Medicines Act

11. Mining Act

7 DATA BASES AND INFORMATION SYSTEMS

There are several hundred information systems that may be useful to toxic substances control programs in and around the Great Lakes Basin. Each agency of each jurisdiction supports at least one system and has access to many more. These systems generally permit the storage, retrieval, and manipulation of two types of information: bibliographic data or selected chemical data. Some of these systems operate manually; the great majority are automated.

The Toxic Substances Committee intends to carry out an assessment and evaluation of the existing data bases and information systems to determine which would be most useful to those involved in Great Lakes toxics programs. The assessment will be conducted in relation to the toxic substances framework (Chapter 2), since each element within the framework will have its own data requirements.

ASSESSMENT

The assessment and evaluation will consist of four components, the first of which has been completed.

SYSTEM IDENTIFICATION

The Toxic Substances Committee has compiled an initial listing of systems containing toxics-related information and operating within easy access of the Great Lakes Basin. The listing, presented below, includes the name and the abbreviation for each system identified. Both bibliographic and chemical data systems are included. The sources of this information include existing directories as well as informal inquiries to relevant agencies.

SYSTEM CHARACTERIZATION

Information systems containing selected chemical data will be the first to be characterized since they represent a direct input for the data requirements of elements of the framework. Bibliographic information systems, on the other hand, require an intermediate step of data extraction. These latter systems will be dealt with subsequently since they do represent a data source of broad coverage that can be interpreted by the individual user.

Each system will be characterized according to the following elements: abbreviation, system title, author and supporting agency, system manager or contact name, abstract of scope and purpose, availability (or citation) of documentation, cost and accessibility, and restrictions on use.

SYSTEM EVALUATION

Each system will be evaluated for its applicability to the information requirements of the various elements of the framework. It is implicit that the information requirements must be identified first. These data needs will fall into the following areas: predictive and environmental fate, commercial

use pattern, transformation and persistence, environmental and human effects, and environmental and exposure measurement.

These systems will also be judged as to their accuracy and frequency of updating.

SYSTEM USAGE

A measure of a system's usefulness would aid the evaluation of such systems. The factors to be examined include frequency of use, ease of use, purpose of use, and any outstanding, good or bad points about the system.

INITIAL INVENTORY

The initial inventory of toxic substances data bases and information systems is presented on the following pages. The following key pertains:

CD - Chemical data extracted from the literature

B - Bibliographic data

* - Manual system

References are given at the end of the compilation on page 95.

A4DIS
Astro-4 Drug Information System
Data Type: CD
Initial Reference Number: 4

ACIDS
Army Chemical Information and Data System
Data Type: CD *
Initial Reference Number: 4

ACMUSC
Atlas of Cancer Mortality for US Counties: 1950-1969
Data Type: CD *
Initial Reference Number: 4

ACT
Advisory Center on Toxicology
Data Type: B *
Initial Reference Number: 4

ADP
Association of Data Base Producers
Data Type: B
Initial Reference Number: 4

AEROS
Aerometric and Emissions Reporting System
Data Type: CD
Initial Reference Number: 4

AGRICOLA
Agricultural On-Line Access
Data Type: B
Initial Reference Number: 4

AHDA
Animal History Data System
Data Type: CD
Initial Reference Number: 4

AIDS
Wood Products Industry Information
Data Type: B
Initial Reference Number: 7

AITR
American International Trade Index Register
Data Type: CD
Initial Reference Number: 4

API/LIT
American Petroleum Institute Literature
Data Type: B
Initial Reference Number: 1

API/PAT
American Petroleum Institute Patents
Data Type: B
Initial Reference Number: 1

APTIC
Air Pollution Technical Information Center
Data Type: B
Initial Reference Number: 4

AQIPP
Air Quality Implementation Planning Program
Data Type: B
Initial Reference Number: 4

ARS
Agricultural Research Service
Data Type: B
Initial Reference Number: 4

ASFA
Aquatic Sciences and Fisheries Abstracts
Data Type: B
Initial Reference Number: 1

ASI
American Statistics Index
Data Type: B CD
Initial Reference Number: 1

ASII
Annual Survey of Injuries and Illnesses
Data Type: CD *
Initial Reference Number: 4

ASM
Annual Survey of Manufacturers
Data Type: CD *
Initial Reference Number: 4

BA
Biological Previews
Data Type: B
Initial Reference Number: 8

BACK 66
Medical Literature 1966 - 1968
Data Type: B
Initial Reference Number: 1

BACK 69
Medical Literature 1969 - 1971
Data Type: B
Initial Reference Number: 1

BACK 72
Medical Literature 1972 - 1974
Data Type: B
Initial Reference Number: 1

BACK 75
Medical Literature Pre 1977
Data Type: B
Initial Reference Number: 1

BCDSP
Boston Collaborative Drug Surveillance Program
Data Type: CD
Initial Reference Number: 4

BIO-STORET
Biological Data Storage and Retrieval System
Data Type: CD
Initial Reference Number: 4

BIOCODES
Biosis Codes
Data Type: B
Initial Reference Number: 1

BIOSIS
Biosciences Information Services
Data Type: B
Initial Reference Number: 4

BRS
Bibliographic Retrieval Services
Data Type: B
Initial Reference Number: 7

BSG
Biomedical Studies Group
Data Type: CD *
Initial Reference Number: 4

BTRDB
Bird Toxicity and Repellancy Data Base
Data Type: CD
Initial Reference Number: 4

C3
Chemicals in Canadian Commerce
Data Type: CD
Initial Reference Number: 6

CAB
Commonwealth Agricultural Bureau Abstracts
Data Type: B
Initial Reference Number: 1

CAC
Chemical Abstracts Condensates
Data Type: B
Initial Reference Number: 1

CAN/OLE
Canadian On-Line Inquiry
Data Type: B
Initial Reference Number: 6

CAN/SDI
Canadian Selective Dissemination of Information
Data Type: B
Initial Reference Number: 6

CANCERLINE
Cancer Information On-Line
Data Type: B
Initial Reference Number: 4

CANCERLIT
Cancer Therapy Abstracts
Data Type: B
Initial Reference Number: 1

CANCERPROJ
Cancer Projects Abstracts
Data Type: B
Initial Reference Number: 1

CANSIM
Canadian Socioeconomic Information Management System
Data Type: CD
Initial Reference Number: 1

CANUTEC
Canadian Transport Emergency Centre
Data Type: CD *
Initial Reference Number: 6

CAPC
Chemical Abstracts Patent Concordance
Data Type: B
Initial Reference Number: 1

CAS
Chemical Abstracts Service Information System
Data Type: B
Initial Reference Number: 4

CASCRS
Chemical Abstracts Service Chemical Registry System
Data Type: CD
Initial Reference Number: 4

CASIS
Chemical Abstracts Service Information System
Data Type: B
Initial Reference Number: 4

CATLINE
Library of Medicine Cataloguing
Data Type: B
Initial Reference Number: 1

CBDBHI
Chemical-Biological Data Base for Herbicidal Information
Data Type: CD
Initial Reference Number: 4

CBDS
Carcinogenesis Bioassay Data System
Data Type: CD
Initial Reference Number: 4

CBFTS
Census Bureau Foreign Trade Statistics
Data Type: CD
Initial Reference Number: 4

CCR
Canadian Chemical Register
Data Type: CD
Initial Reference Number: 6

CD
Chemical Dictionary
Data Type: B
Initial Reference Number: 4

CDA
Comprehensive Dissertation Abstracts
Data Type: B
Initial Reference Number: 1

CDB
Contaminants Data Base for Fish
Data Type: CD
Initial Reference Number: 6

CDC
Chemical Data Centre
Data Type: CD
Initial Reference Number: 4

CDI
Comprehensive Dissertation Index
Data Type: B
Initial Reference Number: 1

CDS
Compliance Data System
Data Type: CD
Initial Reference Number: 9

CDS
Chemistry Data System
Data Type: CD
Initial Reference Number: 4

CE
Canadian Environment (was CWA)
Data Type: B
Initial Reference Number: 7

CEBAS
Chemistry and Effects of Biocides in Aquatic Systems
Data Type: CD
Initial Reference Number: 4

CEH
Chemical Economics Handbook
Data Type: CD *
Initial Reference Number: 4

CERIRS
Current Energy Research Information Retrieval System
Data Type: B
Initial Reference Number: 4

CES
Current Employment Statistics
Data Type: CD
Initial Reference Number: 4

CES
Chick Embryo System
Initial Reference Number: 4

CHEMDEX
Chemical Abstracts Dictionary
Data Type: B
Initial Reference Number: 2

CHEMLINE
Chemical Dictionary On-Line
Data Type: CD
Initial Reference Number: 4

CHEMNAME
Chemical Name Dictionary
Data Type: B
Initial Reference Number: 1

CHEMRIC
Chemical Monograph Referral Center
Data Type: B
Initial Reference Number: 4

CHEMTREC
Chemical Transportation Emergency Center
Data Type: CD *
Initial Reference Number: 4

CHRIS
Chemical Hazard Response Information System
Data Type: CD *
Initial Reference Number: 4

CICCP
Component Information for Chemical Consumer Products
Data Type: CD
Initial Reference Number: 4

CIDS
Chemical Information and Data System
Data Type: CD
Initial Reference Number: 4

CIN
Chemical Industry Notes
Data Type: B
Initial Reference Number: 1

CIR
Current Industrial Reports
Data Type: CD *
Initial Reference Number: 4

CIS
Chemical Information System
Data Type: CD B
Initial Reference Number: 4

CIS INDEX
Congressional Information Service Index
Data Type: B
Initial Reference Number: 4

CIWD
Catalog of Information on Water Data
Data Type: CD *
Initial Reference Number: 4

CLAIMS/CHEM
US Chemical Patents
Data Type: B
Initial Reference Number: 1

CLAIMS/CLASS
US Chemical Patents Classification
Data Type: B
Initial Reference Number: 1

CLAIMS/GEN
US General, Electrical, Mechanical Patents
Data Type: B
Initial Reference Number: 2

CLAIMS/US PAT
US Patents Multifield
Data Type: B
Initial Reference Number: 7

CLDS
Canada Land Data System
Data Type: CD
Initial Reference Number: 8

CLI
Canadian Land Inventory
Data Type: CD
Initial Reference Number: 1

CLINPROT
Cancer Projects Abstracts
Data Type: B
Initial Reference Number: 1

CLRI
Customs Laboratory Reports Index
Data Type: CD
Initial Reference Number: 6

CLS
Clintox Literature System
Data Type: B
Initial Reference Number: 4

CM
Census of Manufacturers
Data Type: CD *
Initial Reference Number: 4

CMA/EMA
Chemical and Electronics Market Abstracts
Data Type: B
Initial Reference Number: 2

CNF
Chemical Names File
Data Type: CD B
Initial Reference Number: 4

COAL-ABS
Coal Abstracts
Data Type: B
Initial Reference Number: 1

COLD REGIONS
Cold Regions
Data Type: B
Initial Reference Number: 9

COMPENDEX
Compendium of Industrial Journals (see EI)
Data Type: B
Initial Reference Number: 7

CONF
Conference Abstracts
Data Type: B
Initial Reference Number: 1

CPCP
Compendium of Pest Control Products
Data Type: CD
Initial Reference Number: 6

CPI
Conference Papers Index
Data Type: B
Initial Reference Number: 1

CRECORD
Congressional Record Abstracts
Data Type: B
Initial Reference Number: 4

CRIS
Current Research Information System
Data Type: B
Initial Reference Number: 1

CSI
Chemical Structure Index
Data Type: CD *
Initial Reference Number: 4

CT
Compendium of Toxicology
Data Type: CD
Initial Reference Number: 4

CTCP
Clinical Toxicology of Commercial Products
Data Type: CD
Initial Reference Number: 4

CTDRS
Chemical Toxicological Data Retrieval System
Data Type: CD
Initial Reference Number: 4

CUR
Carcinogen Use Registry
Data Type: CD
Initial Reference Number: 4

CWA
Canada Water (Environment Canada)
Data Type: B
Initial Reference Number: 1

D & B
Dunn and Bradstreet
Data Type: B
Initial Reference Number: 1

D-REF
Data Reference
Data Type: B
Initial Reference Number: 1

DBES
Data Bases for Energy Systems
Data Type: B
Initial Reference Number: 4

DBUSITC
Data Base of the US International Trade Commission
Data Type: CD
Initial Reference Number: 4

DCP
Directory of Chemical Producers USA
Data Type: CD *
Initial Reference Number: 4

DDC
Defence Documentation Center
Data Type: B
Initial Reference Number: 4

DDIS
Drug Distribution and Inventory System
Data Type: CD
Initial Reference Number: 4

DEL
Directory of World Literature on Water
Data Type: B
Initial Reference Number: 7

DERWENT
World Patent Information
Data Type: B
Initial Reference Number: 2

DFSRU
Directory of Federally Supported Research - University
Data Type: B
Initial Reference Number: 1

DIALOG
Directory of Industry Information
Data Type: B
Initial Reference Number: 7

DISCLOSURE
Public Company Disclosure
Data Type: B
Initial Reference Number: 1

DMI
Dun's Market Identifiers
Data Type: CD
Initial Reference Number: 4

DR&D/CIS
Drug Research and Development Chemical Information System
Data Type: CD
Initial Reference Number: 4

DRDBD
Drug Research and Development Biological Data
Data Type: CD
Initial Reference Number: 4

DRDCIBF
Drug Research and Development Chemical Information Bibliography File
Data Type: B
Initial Reference Number: 4

DRLS
Drug Registration and Listing System
Data Type: B
Initial Reference Number: 4

DSI
Drug Submissions Information
Data Type: CD
Initial Reference Number: 6

DTESCS
Database on Teratogenic Effects of Selected Chemical Substances
Data Type: CD *
Initial Reference Number: 4

ECDIN
Envionmental Chemical Data and Information Network
Data Type: CD
Initial Reference Number: 4

ECEP
Environmental Contaminant Evaluation Program
Data Type: CD *
Initial Reference Number: 4

ECMP
Environmental Contaminant Monitoring Program
Data Type: CD *
Initial Reference Number: 4

EDB
Energy Data Base
Data Type: B
Initial Reference Number: 9

EDNOHS
Exposure Dictionary for the National Occupational Hazards Survey
Data Type: CD
Initial Reference Number: 4

EDS
Effluent Data System
Data Type: CD
Initial Reference Number: 4

EDS
Emissions Data System
Data Type: CD
Initial Reference Number: 4

EDS
Energy Data System
Data Type: CD
Initial Reference Number: 4

EDS
Environmental Data System
Data Type: B
Initial Reference Number: 4

EHASOC
Environmental and Health Aspects of Selected Organohalide Compounds
Data Type: CD
Initial Reference Number: 4

EI
Engineering Index (see COMPENDEX)
Data Type: B
Initial Reference Number: 1

EIS
Environmental Information System
Data Type: B
Initial Reference Number: 4

EIS-IP
US Industrial Establishments
Data Type: B
Initial Reference Number: 1

EIS-NME
US Industrial Non Manufacturing Establishments
Data Type: B
Initial Reference Number: 1

EL
Explosives Licensing
Data Type: B
Initial Reference Number: 6

ELIAS
Environmental Library Information Abstracts
Data Type: B
Initial Reference Number: 7

EM
Excerpta Medica
Data Type: B
Initial Reference Number: 1

EMIC
Environmental Mutagen Information Center
Data Type: B
Initial Reference Number: 4

ENDEX
Environmental Data Index
Data Type: CD
Initial Reference Number: 4

ENERGYLINE
Energy Abstracts
Data Type: B
Initial Reference Number: 1

ENVIROLINE
Environmental Literature Abstracts
Data Type: B
Initial Reference Number: 1

EPB
Environmental Periodicals Bibliography
Data Type: B
Initial Reference Number: 1

EPEAR
Environmental Pollution Effects on Aquatic Resources
Data Type: B *
Initial Reference Number: 4

ERDI
Energy Research and Development Inventory
Data Type: B
Initial Reference Number: 4

ERSOIA
Environmental Reports Summaries of the Office of International Activities
Data Type: B
Initial Reference Number: 4

ESIC
Environmental Science Information Center
Data Type: B
Initial Reference Number: 4

ESPS
Epidemiological Studies Program System
Data Type: B
Initial Reference Number: 4

ETIC
Environmental Teratology Information Center
Data Type: B
Initial Reference Number: 4

FA
Foods Adlibra
Data Type: B
Initial Reference Number: 1

FCLDBI
Fish Control Lab Data Base Information
Data Type: CD B *
Initial Reference Number: 4

FEDREG
Federal Register Abstracts
Data Type: B
Initial Reference Number: 1

FGI
Foundation Grants Index
Data Type: B
Initial Reference Number: 1

FIESR
Federal Inventory of Environment and Safety Research
Data Type: CD
Initial Reference Number: 4

FISR
Food Information Storage and Retrieval
Data Type: CD
Initial Reference Number: 4

FPR
Fish - Pesticide Research
Data Type: CD *
Initial Reference Number: 4

FS
Frost and Sullivan US Defense Contracts
Data Type: B
Initial Reference Number: 1

FSTA
Food Science and Technology Abstracts
Data Type: B
Initial Reference Number: 1

GEMS
Global Environmental Monitoring System
Data Type: CD *
Initial Reference Number: 4

GEOARCHIVE
Geoarchive
Data Type: B
Initial Reference Number: 9

GEOREF
Geographical References
Data Type: B
Initial Reference Number: 1

GIS
Grant Information System
Data Type: B
Initial Reference Number: 2

GLECS
Great Lakes Environmental Contaminant Survey
Data Type: CD
Initial Reference Number: 4

GRANTS
Grants Program Index
Data Type: B
Initial Reference Number: 1

HAHC
Health Assessment of Hazardous Chemicals
Data Type: CD
Initial Reference Number: 6

HATREMS
Hazardous and Trace Emissions System
Data Type: CD
Initial Reference Number: 4

HAZMATS
Hazardous Materials System
Data Type: CD
Initial Reference Number: 6

HBS
Human Blood Sampling
Data Type: CD
Initial Reference Number: 6

HHE
Health Hazard Evaluations
Data Type: CD *
Initial Reference Number: 4

HM
Heavy Metals
Data Type: CD *
Initial Reference Number: 4

HMRTEAE
Heavy Metals and Related Trace Elements in Aquatic Environments
Data Type: CD
Initial Reference Number: 4

IBSCBTC
Information Bulletin of the Survey of Chemicals Be ing Tested for Carcinogenicity
Data Type: CD *
Initial Reference Number: 4

ICCTPDB
Inorganic Chemical Computer Toxicology Parameter Data Base
Data Type: CD B
Initial Reference Number: 4

ICEC
International Cancer Epidemiology Clearinghouse
Data Type: CD *
Initial Reference Number: 4

ICRS
Index Chemicals Registry System
Data Type: B
Initial Reference Number: 4

IED
Import Export Data
Data Type: CD
Initial Reference Number: 6

IJCCPFC
International Joint Commission Coordinated Program on Fish Contaminants
Initial Reference Number: 4

INSPEC
Institute of Electrical Engineers
Data Type: B
Initial Reference Number: 1

IPA
International Pharmaceutical Abstracts
Data Type: B
Initial Reference Number: 1

IPCCDB
Industrial Press Chemical Data Base
Data Type: CD
Initial Reference Number: 4

IPDB
Industrial Process Data Base
Data Type: B
Initial Reference Number: 6

IRPTC
International Registry of Potentially Toxic Chemicals
Data Type: CD
Initial Reference Number: 4

IRSS
National Center for Toxicological Research Integrated Support
Data Type: CD
Initial Reference Number: 4

IRSSEI
International Referral System for Sources of Environmental Information
Data Type: B *
Initial Reference Number: 4

IS
Industrywide Studies
Data Type: CD
Initial Reference Number: 4

ISHOW
Information System for Hazardous Organics in a Water Environment
Data Type: CD
Initial Reference Number: 7

ISMEC
Information Service in Mechanical Engineering
Data Type: B
Initial Reference Number: 1

ISRS
Information Storage and Referral Section
Data Type: B
Initial Reference Number: 4

KOECT
Kirk Othmer Encyclopedia of Chemical Technology
Data Type: CD *
Initial Reference Number: 4

LABORDOC
Economic Social and Industrial Relations
Data Type: B
Initial Reference Number: 1

LADB
Laboratory Animal Data Base
Data Type: CD
Initial Reference Number: 4

MAPID
Manufacturing and Primary Industrie Division Data
Data Type: CD
Initial Reference Number: 6

MCSS
Mineral Commodity Survey System
Data Type: CD
Initial Reference Number: 4

MEAP
Marine Ecosystem Analysis Program
Data Type: B
Initial Reference Number: 4

MEDLARS
Medical Literature Analysis and Retrieval System
Data Type: B
Initial Reference Number: 2

MEDLINE
Medical Literature Analysis and Retrieval System On-Line
Data Type: B
Initial Reference Number: 4

MEIS
Military Entomology Information Service
Data Type: B
Initial Reference Number: 4

METADEX
Metals Abstracts
Data Type: B
Initial Reference Number: 1

MFFP
Microconstituents in Fish and Fishery Products
Data Type: CD
Initial Reference Number: 4

MGA
Meteorological and Geoastrophysical Abstracts
Data Type: B
Initial Reference Number: 1

MI
Magazine Index
Data Type: B
Initial Reference Number: 1

MITES
Merck Index Text Editing System
Data Type: CD
Initial Reference Number: 4

MNT
Mining Technology
Data Type: B
Initial Reference Number: 7

MPIMP
Meat and Poultry Inspection Monitoring Program
Data Type: CD
Initial Reference Number: 4

MSDC
Mass Spectrometry Data System
Data Type: CD
Initial Reference Number: 4

MSI
Mass Spectral Identification
Data Type: CD
Initial Reference Number: 4

MTRDB
Mammal Toxicity and Repellency Data Base
Data Type: CD
Initial Reference Number: 4

MUNDAT
Municipal Waterworks and Wastewater Systems
Data Type: CD
Initial Reference Number: 3

NAPS
National Air Pollution Surveillance System
Data Type: CD
Initial Reference Number: 6

NAQUADAT
National Water Quality Data
Data Type: CD
Initial Reference Number: 1

NASASTIS
National Aeronautics and Space Administration Scientific and Technical Information Systems
Data Type: B
Initial Reference Number: 4

NASN
National Air Surveillance Network
Data Type: CD
Initial Reference Number: 4

NATES
National Analysis of Trends in Emergencies System
Data Type: CD
Initial Reference Number: 6

NAWDEX
National Water Data Exchange
Data Type: CD *
Initial Reference Number: 4

NCHS
National Center for Health Statistics
Data Type: CD
Initial Reference Number: 4

NCTR/IRSS
National Center for Toxicological Research Integrated Research Support System
Data Type: B
Initial Reference Number: 4

NEDS
National Emisssions Data
Data Type: CD
Initial Reference Number: 4

NEELS
National Emergency Equipment Locator System
Data Type: B
Initial Reference Number: 1

NEIS
National Emission Inventory System
Data Type: CD
Initial Reference Number: 6

NEISS
National Electronic Injury Surveillance System
Data Type: CD
Initial Reference Number: 4

NF
National Foundation Grant Awards
Data Type: B
Initial Reference Number: 1

NIEERD
National Index of Energy and Environmental Related Data
Data Type: B
Initial Reference Number: 4

NIOSHTIC
National Institute for Occupational Safety and Health Technical Information Center
Data Type: B
Initial Reference Number: 4

NMEP
National Marine Emergency Plan
Data Type: B
Initial Reference Number: 6

NOHS
National Occupational Hazard Survey
Data Type: CD
Initial Reference Number: 4

NPDES
National Pollutant Discharge Elimination System
Data Type: CD
Initial Reference Number: 4

NPSPCS
National Park Service Pest Control System
Data Type: CD
Initial Reference Number: 4

NSA
Nuclear Science Abstracts
Data Type: CD
Initial Reference Number: 9

NSC
Nuclear Science Information
Data Type: CD
Initial Reference Number: 9

NTIS
National Technical Information Service
Data Type: B
Initial Reference Number: 4

OA
Oceanic Abstracts
Data Type: B
Initial Reference Number: 4

OASIS
Oceanic and Atmospheric Scientific Information System
Data Type: B
Initial Reference Number: 4

OCPDB
Organic Chemical Producers Data Base
Data Type: CD B
Initial Reference Number: 4

OHMTADS
Oil and Hazardous Materials Technical Assistance Data System
Data Type: CD
Initial Reference Number: 4

ORNL-EMIC-1
The Mutagenicity and Teratogenicity of a Selected Number of Food Additives
Data Type: CD *
Initial Reference Number: 4

OSH
Occupational Safety and Health
Data Type: B
Initial Reference Number: 4

OSRDCS
Office of Standard Reference Data Chemical Files
Data Type: CD *
Initial Reference Number: 4

PA
Pollution Abstracts
Data Type: B
Initial Reference Number: 4

PAB
Pollution Abstracts
Data Type: B
Initial Reference Number: 1

PAIS
Public Affairs Information Service
Data Type: B
Initial Reference Number: 9

PAPERCHEM
Paper Chemistry
Data Type: B
Initial Reference Number: 1

PARCS
Pesticide Analysis Retrieval and Control System
Data Type: CD
Initial Reference Number: 4

PBM/STIRS
Mass Spectral Data
Data Type: CD
Initial Reference Number: 2

PCCC
Poison Control Centres of Canada
Initial Reference Number: 4

PCOLIS
Poison Control OnLine Inquiry System
Data Type: CD B
Initial Reference Number: 4

PDS
Petroleum Data System
Data Type: CD
Initial Reference Number: 1

PEMS
Pesticide Enforcement Management System
Data Type: CD
Initial Reference Number: 4

PENEWS
Petroleum Energy Business News
Data Type: B
Initial Reference Number: 1

PIC
Pesticide and Industrial Chemicals
Data Type: CD
Initial Reference Number: 4

PIRA
Paper Industries Research Institute
Data Type: B
Initial Reference Number: 1

PNI
Pharmaceutical News Index
Data Type: B
Initial Reference Number: 1

POISINDEX
Poison Index
Data Type: CD *
Initial Reference Number: 4

POLLUTION
Pollution and Environmental Literature
Data Type: B
Initial Reference Number: 2

PPDB
Pest Product Data Base
Data Type: CD
Initial Reference Number: 6

PPDS
Physical Property Data System
Data Type: CD
Initial Reference Number: 1

PREDICAST
Predicasts Marketing Systems
Data Type: B
Initial Reference Number: 4

PROMPT
Technology and Market Patterns
Data Type: B
Initial Reference Number: 1

PRS
Pesticide Reporting System
Data Type: CD
Initial Reference Number: 4

PSS
Population Studies System
Data Type: CD
Initial Reference Number: 4

PTS-FI
Federal Index
Data Type: B
Initial Reference Number: 1

PTS-PROMPT
Market Abstracts
Data Type: B
Initial Reference Number: 1

RAPRA
Rubber and Plastics Research Abstracts
Data Type: B
Initial Reference Number: 1

REDNITRAC
Reporting of Economic Data for Negotiation of International Transportation Conventions
Data Type: CD
Initial Reference Number: 4

RINGDOC
Pharmaceutical Literature
Data Type: B
Initial Reference Number: 1

RISC
Restricted Information System on Chemicals
Data Type: CD
Initial Reference Number: NS

RPCIM
Research Program of Chemicals that Impact Man
Data Type: CD B
Initial Reference Number: 4

RSC
Revised Statutes of Canada
Data Type: B
Initial Reference Number: 1

RTCW
Registry of Toxic Chemicals in Wildlife
Data Type: CD
Initial Reference Number: 6

RTECS
Registry of Toxic Effects of Chemical Substances
Data Type: CD B
Initial Reference Number: 4

SAFETY
Science of Safety
Data Type: B
Initial Reference Number: 1

SCISEARCH
Science Citation Index
Data Type: B
Initial Reference Number: 1

SCORPIO
Subject - Content - Oriented Retriever for Processing Information On-Line
Data Type: B
Initial Reference Number: 4

SCP
Standards Completion Program
Data Type: CD B
Initial Reference Number: 4

SCTC
Survey of Compounds which have been Tested for Carcinogenicity
Data Type: B CD
Initial Reference Number: 4

SDILINE
MEDLINE Current Month
Data Type: B
Initial Reference Number: 1

SDMF
Single Drug Master File
Data Type: B
Initial Reference Number: 4

SDS
Supplementary Data System
Data Type: CD
Initial Reference Number: 4

SEAS
Strategic Environmental Assessment System
Data Type: CD
Initial Reference Number: 4

SERLINE
Serials of Major Medical Libraries
Data Type: B
Initial Reference Number: 1

SIC
Standard Industrial Classification
Data Type: CD
Initial Reference Number: 1

SMBS
Scientific Manuscript Bibliographic System
Data Type: B
Initial Reference Number: 4

SOL
Solid Waste Management
Data Type: B
Initial Reference Number: 1

SPIN
Searchable Physics Information Notices
Data Type: B
Initial Reference Number: 1

SRSB
Scientific Reference Services Branch
Data Type: B *
Initial Reference Number: 4

SSIE
Smithsonian Scientific Information Exchange
Data Type: CD
Initial Reference Number: 4

STAR
Storage and Retrieval of Scientific Data
Data Type: CD
Initial Reference Number: 7

STEEL
Steel Industry Data
Data Type: B
Initial Reference Number: 2

STMBC
Solids Transport for Mobile Boundary Channels
Data Type: CD
Initial Reference Number: 1

STO
Standing Orders of the House of Commons
Data Type: B
Initial Reference Number: 8

STORET
Storage and Retrieval for Water Quality Data
Data Type: CD
Initial Reference Number: 4

STRCDB
Special Trade Representatives Centralized Data Bank
Data Type: CD
Initial Reference Number: 4

STRESS
Stress Response Environmental Statistics System
Data Type: CD
Initial Reference Number: 6

SWD
Surface Water Data
Data Type: CD
Initial Reference Number: 1

SWEMS
Soil, Water, Estuarine Monitoring System
Data Type: CD *
Initial Reference Number: 4

SWIRS
Solid Waste Information Retrieval System
Data Type: B
Initial Reference Number: 4

SWRA
Selected Water Resources Abstracts
Data Type: B
Initial Reference Number: 1

TCA
Trace Contaminants Abstracts
Data Type: B *
Initial Reference Number: 4

TDB
Toxicology Data Bank
Data Type: B CD
Initial Reference Number: 4

TDC
Technical Data Center
Data Type: B *
Initial Reference Number: 4

TEIRS
The Environment Information Retrieval System
Data Type: CD
Initial Reference Number: 4

TITUS
Textile Industries
Data Type: B
Initial Reference Number: 1

TMIC
Toxic Materials Information Center
Data Type: CD
Initial Reference Number: 4

TNIC
Trade Name Ingredient Clarification
Data Type: CD
Initial Reference Number: 4

TOX-TIPS
Toxicology Testing in Progress System
Data Type: B CD
Initial Reference Number: 4

TOXBACK
TOXLINE pre 1974
Data Type: B
Initial Reference Number: 1

TOXLINE
Toxicology Information On-Line
Data Type: B
Initial Reference Number: 4

TPRC
Thermophysical Properties Research Center
Data Type: CD
Initial Reference Number: 4

TRM
Transportation of Radioactive Materials
Data Type: CD
Initial Reference Number: 6

TRPD
Toxicology Research Projects Directory
Data Type: B *
Initial Reference Number: 4

TS
Toxicological Studies
Initial Reference Number: 4

TSCA
TOSCA 1977 Candidate List
Data Type: CD B
Initial Reference Number: 2

TULSA
Oil and Gas Industry Abstracts
Data Type: B
Initial Reference Number: 1

UNION
Union List of Scientific Canadian Serials
Data Type: B
Initial Reference Number: 8

USDA-ERS/UP
USDA-ERS Use of Pesticides
Initial Reference Number: 4

VIOLOG
VIOLOG
Initial Reference Number: 4

WAA
World Aluminum Abstracts
Data Type: B
Initial Reference Number: 1

WATDOC
Water Resources Document Reference Centre
Data Type: B
Initial Reference Number: 3

WATENIS
Water Effluent National Information System
Data Type: CD
Initial Reference Number: 3

WATERDROP
Distribution Register of Organic Pollutants in Water
Data Type: CD
Initial Reference Number: 4

WATSTORE
Water Storage Data and Retrieval System
Data Type: CD
Initial Reference Number: 4

WELDASEARCH
Weldasearch
Data Type: CD
Initial Reference Number: 9

WP
Wood Products
Data Type: B
Initial Reference Number: 2

WPI
World Patents Index
Data Type: B
Initial Reference Number: 1

WQDB
Water Quality Data Base
Data Type: CD
Initial Reference Number: 4

WRA
Water Resources Abstracts
Data Type: B
Initial Reference Number: 9

WRSIC
Water Resources Scientific Information Center
Data Type: B
Initial Reference Number: 4

WTA
World Textile Abstracts
Data Type: B
Initial Reference Number: 1

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2) IRPTC, European On-Line Information Services Relevant to IRPTC Attributes, UNEP, Geneva (1978).

3) Kuch, JB, Storage and Retrieval of Chemical Information on Drinking Water Supplies in Canada-Final Report, Ottawa (1977).

4) Metri Corporation, Chemical Substances Information Network, Vol. I and II, NTIS, Springfield (1977).

5) CECOS

6) CCREM Data System Report

7) Data System Summary Report for COA Technical Committee

8) Other (Data System Pamphlets etc.)

9) Data Base Status for October 1979, U.S. Environmental Protection Agency.

TERMS OF REFERENCE
TOXIC SUBSTANCES COMMITTEE

Under the direction of the Great Lakes Water Quality Board, the Toxic Substances Committee will assist the Board in evaluating the progress of the jurisdictions in implementing programs to meet the requirements of the Great Lakes Water Quality Agreement of 1978. Specifically, the Toxic Substances Committee will:

1. Provide the Board on an annual basis with a comprehensive report on the status of the development and implementation of toxic substances programs within the jurisdictions. This report should evaluate the effectiveness of such programs in terms of the time frame of the Agreement as well as identifying deficiencies in scope, funding and compatibility of results among the programs.

2. Establish and maintain a close working relationship with the Science Advisory Board and others within the IJC framework to promote coordination of effort and to avoid duplication and overlap in the toxic substances program area.

3. Provide advice and assistance to the Water Quality Programs Committee for their biennial and special reports, for example, on the development of monitoring plans to detect and evaluate the extent of toxic pollution within the Great Lakes ecosystem, and on the criteria and guidelines for the designation of "problem areas".

4. On an ongoing basis, provide the Great Lakes Water Quality Board with advice and recommendations on future programs or arrangements which should be developed and implemented by the jurisdictions as interim measures until the programs called for in the Agreement are in place.

5. Subject to the approval of the Board, the Toxic Substances Committee shall strike working groups to assist in the discharge of its responsibilities.

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